

REMARKS/ARGUMENTS

A PETITION FOR EXTENSION OF TIME has been filed, concurrently with this Amendment, extending the time for response to the Official Action one (1) month, from September 3, 2004, to October 3, 2004.

As a result of this Amendment, claims 12-14 and 21-26 are under active consideration in the subject patent application.

In the Official Action, the Examiner has:

(1) stated that the Declaration under 37 C.F.R. §1.131 on 2/05/2004, is considered ineffective in overcoming the reference U.S. Patent No. 6,571,117, issued to Marbach;

(2) rejected claims 12 and 14 under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,571,117, issued to Marbach;

(3) rejected claims 21 and 22 under U.S.C. § 103(a) in view of U.S. Patent No. 6,571,117;

(4) objected to claim 13 as being dependent upon a rejected base claim, but indicating that claim 13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims;

(5) rejected claim 17 under 35 U.S.C. §112, second paragraph, issued to Marbach;

(6) rejected claim 17 under U.S.C. §102(e) in view of U.S. Patent No. 6,392,752, issued to Johnson; and

(7) rejected claim 17 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,483,641, issued to MacAulay.

With regard to Items 1-3, the Examiner has rejected claims 12 and 14 under 35 U.S. C. §102(e) as being anticipated by U.S. Patent No. 6,571,117, issued to Marbach, and claims, 21 and 22 as being obvious in view of Marbach. The Examiner has stated that the Declaration under 37 C.F.R. §1.131 that was submitted on February 5, 2004 is considered ineffective in overcoming U.S. Patent No. 6,571,117, issued to Marbach. Applicants respectfully disagree with the Examiner's characterization of that Declaration and of the Marbach patent, and request reconsideration for the following reasons.

More particularly, the Marbach patent issued on May 27, 2003, from Application Serial No. 09/925,380, filed August 10, 2001, and claiming the benefit of Provisional Patent Application Serial No. 60/224,533, filed August 11, 2000. Thus the Marbach reference issued less than one year from the filing date of the instant application. The claims of the Marbach reference are directed to a wholly distinct and separate invention when compared to Applicant's claimed invention (i.e., a noninvasive blood analysis methods versus a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system).

Applicants respectfully submit that the Marbach reference is not valid prior art with respect to the instant Application, since the present invention was conceived prior to August 11, 2000, and Applicants worked diligently to a

reduction to practice at least as early as October 13, 2000, when Provisional Patent Application Serial No. 60/239,969 was filed, and from which parent Patent Application Serial No. 09/976,391, filed October 12, 2001, claims the benefit.

In support of Applicants' position that the Marbach reference is not valid prior art under 35 U.S. C. §102(e), an Affidavit under 37 C.F.R. 1.131, had been submitted to the Examiner in response to the Official Action mailed February 5, 2004. In order to comply with the Examiner's objections to that submission, a second Affidavit under 37 C.F.R. 1.131, is attached to this Amendment. This second Rule 1.131 Affidavit of Patrick J. Treado, Matthew Nelson, and Scott Keltzer and its supporting Exhibits A-Q provide ample factual documentary evidence of Applicants' conception of their invention prior to August 11, 2000, and of their diligence in moving from conception to a reduction to practice. Accordingly, the Marbach reference is not valid prior art with respect to Applicant's invention. Claims 12, 14, 21, and 22 are allowable over the Marbach reference.

With regard to Item 4, Applicants acknowledge with appreciation the Examiner's determination that the limitations of the independent claim 12 combined with the limitations of claim 13 presents subject matter that is allowable over all of the prior art of record in the case.

With regard to Items 5-7, Applicants have combined the allowable subject matter presented by the combination of claims 12 and 13 with the subject matter of now cancelled claim 17. This combination has been presented as new claims

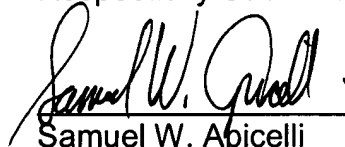
23-24. The subject matter of claims 21 and 22 has been combined with the allowable subject matter of claims 12 and 13 in new claims 25 and 26. New claims 23-26 are allowable. The Commissioner is authorized to charge the fees in connection additional independent claims namely, \$132.00, and the fees for a Petition for Extension of one (1) month , namely, \$55.00, and any additional fees in connection with this matter, to Deposit Account No. 04-1679.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicants' undersigned Attorney invites the Examiner to telephone him at 717-237-5516.

Date: 10/1/04

Respectfully Submitted,



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/773,077
Applicant : Patrick TREADO et al.
Filed : 05 February 2004
Title : NEAR INFRARED CHEMICAL
IMAGING MICROSCOPE
TC/A.U. : 2877
Examiner : Lauchman, Layla G

Docket No. : E2079-00028 (030687)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

AFFIDAVIT OF PATRICK J. TREADO, MATTHEW NELSON, AND SCOTT KELTZER
UNDER 37 C.F.R. 1.131

We, Patrick J. Treado, Matthew Nelson, and Scott Keltzer, the sole inventors
named in the above-identified patent application ("the '077 application") state as follows:

1. All of the events outlined below occurred in the United States of America.
2. Prior to August 11, 2000, we invented a chemical imaging system
comprising a near infrared imaging detection system and a visible imagery system.
3. We were, at the time of the conception of our invention employed by
ChemImage Corporation, of Pittsburgh, Pennsylvania.

4. Prior to August 11, 2000, and as a part of our on-going, diligent efforts to reduce our invention to practice, we conducted a series of laboratory based tests of our conception of a chemical imaging system comprising of a near infrared imaging detection system and a visible imagery system.

5. During the Spring of 1999, Juliana Ribar was an employee of ChemImage Corporation having duties of conducting testing on products and technologies developed by researchers, including ourselves, at ChemImage Corporation.

6. During this time Juliana Ribar reported to ChemImage Senior Scientist, inventor, and one of the undersigned Affiants, Matthew Nelson.

7. During the Spring of 1999, Juliana conducted testing at our request, and under our control and direction, of our chemical imaging system comprising a near infrared imaging detection system and a visible imagery system.

8. As a part of her regular duties, Juliana maintained a laboratory notebook and journal to document her activities and the results of the testing she had been instructed to perform.

9. Matthew Nelson reviewed Juliana Ribar 's work product and signed most of her laboratory notebook entries as a witness.

10. Around April of 1999, investigations were undertaken in the ChemImage laboratory regarding optimal imaging conditions necessary to visualize defects and examine the photoluminescence in the near infrared for a sample CZT.

11. Using a liquid crystal tunable filter imaging device, tuned to different operating conditions, both near infrared (NIR) and visible images were achieved.

12. Between April of 1999 and May of 1999 a variety of experimental configurations as well as imagery and data acquisition modes were used to determine optimal conditions for combined visual imagery and NIR chemical imaging of samples.

13. On or about April 15, 1999, chemical imaging based on a near infrared imaging detection system and a visible imagery system was performed where the operating conditions of the liquid crystal tunable filter were changed to a range of 700 nanometers (nm) to 950nm with a manual setting/control set to 700nm. This combination of a near infrared imaging detection system and a visible imagery system was documented at page 55 of Juliana Ribar's laboratory notebook. (Attached as Exhibit A).

14. The operating condition of 700nm corresponds to wave lengths of light that are visible, therefore the images that were observed in the ChemImage laboratory's on or about April 15, 1999, and are memorialized in Juliana Ribar's laboratory notebook correspond to visual imagery obtained at the same time that a near infrared imaging detection system was employed to produce a chemical image.

15. Such visual images are referred to as "bright field images by microscopists, and these images are recorded in Juliana Ribar's laboratory notebook as "bright field.tif".

16. Near infrared images of samples identified in Juliana Ribar's laboratory notebook are identified as "NIR.tif".

17. An entry at approximately the middle of page 55 of Juliana Ribar's laboratory notebook (Exhibit A) states: "...on the video screen the polarized image can be seen ..." further attesting to the fact that at least as early as April 15, 1999, visual images and NIR chemical imaging had been combined as claimed in our above-identified U.S. patent application.

18. Additional laboratory work comprising a combination of a near infrared imaging detection system and a visible imagery system occurred in and around April 20-April 22, 1999. The results of that laboratory work are schematically shown in pages 56-61 of Juliana Ribar's laboratory notebook, Attached as Exhibit B.

19. The information presented in Exhibit B schematically indicates and logs data for various near infrared images and bright field images of samples with the same file labeling nomenclature.

20. On or about April 23, 1999, documents were generated showing actual bright field images (attached as Exhibit C) in corresponding near infrared chemical images (attached at Exhibit D) both showing particular defects that were imaged using a near infrared imaging detection system and a visible imagery system.

21. On or around May 10, 1999 to May 12, 1999, a variety of additional experimental arrangements of near infrared imaging detection systems and visible

imagery systems were explored at the ChemImage Laboratory, as indicated in page 65 of Juliana Ribar's laboratory notebook, attached as Exhibit E.

22. At the top left portion of Exhibit E, there is a schematic diagram of an apparatus arranged in accordance with the structure defined by claim 1 of U.S. Patent Application Serial No. 10/773,077, and at the upper right there is a notation that visible light having a wavelength of 532nm was employed, with NIR light having a wavelength from 860nm to 870nm which is documented at the center bottom of the page.

23. On or about May 13, 1999, an arrangement of near infrared imaging detection systems and visible imagery systems were assembled with a liquid crystal tunable filter having a range from 680nm to 950nm, again covering visible wavelengths of light to near infrared wavelengths of light. Illumination of the sample during this time was performed using a laser that emitted coherent light at 532nm. This experimental configuration is evidence in Juliana Ribar's laboratory notebook at page 67, attached as Exhibit F.

24. On or about May 24, 1999, a further experimental configuration of an infrared imaging detection system and a visible imagery system was explored in which a laser imitating light at 532nm (visible light) using a Xe/Tungstun lamp was employed.

25. Images from a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system were produced as shown in Exhibits G and H from Juliana Ribar's laboratory notebook, which show bright field

visible images and near infrared images, as captured on pages 77-90 of Juliana Ribar's laboratory notebook as evidenced by Exhibit I.

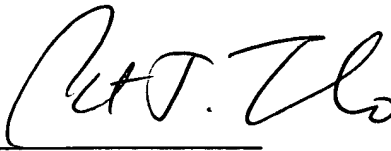
26. Between May of 1999 and October of 2000, a multiplicity of additional experimental configurations for a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system were explored and optimized so as to confirm that our invention continued to operate as conceived and intended, all of which had been documented on: July 6, 1999, as evidenced in Exhibit J; September 7-20, 1999, as evidenced in Exhibit K, on October 12, 1999, as evidenced in Exhibit L, on December 13, 1999, as evidenced in Exhibit M, March 1, 2000, as evidenced in Exhibit N, on March 2, 2000, as evidenced in Exhibit O, on June 1, 2000, as evidenced in Exhibit P, and August 14, 2000, as evidenced in Exhibit Q, all of which work and experimentation convinced us that our invention worked as we intended.

27. As supported by Exhibits A-Q, between May of 1999 and October of 2000, we worked diligently to a reduction to practice of our chemical imaging system comprising a near infrared imaging detection system and a visible imagery system as evidenced by our filing of Provisional Patent Application Serial No. 60/239,969 on October 13, 2000, and from which parent Patent Application Serial No. 09/976,391, filed October 12, 2001, claims the benefit.

28. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the above-identified application or any patent issuing thereon.

Date: 9/29/04



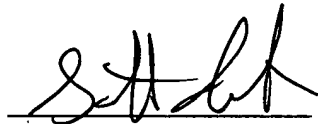
Patrick J. Treado

Date: 9-26-04



Matthew Nelson

Date: 9/28/04



Scott Keltzer

TRANSMISSIONS: (REFLECTANCE) (TRANSMISSION) (REFLECTANCE) (USER-TRANSMITTANCE MODE)
 BRIGHT FIELD, NIR, POLARIZED, PHOTOLUMINESCENCE.

EXPOSURE TIME: 3 SEC 3 SEC 3 SEC 10 SEC.

ROI: 100-511

OBJECTIVE MAGNIFICATION: 20X

LASER: 0.17W

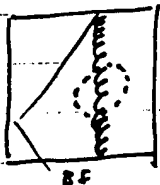
SLUGER: 700-1800 * AT 002, CHANGED TO 700-950.

STEP: 5 BINNING: 2X 2X

LCTF MANUAL CONTROL: 700nm

ETCHED

DEFECT 1-001 3-013 5-006
 2-001 4-007

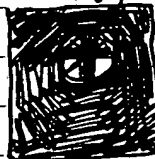


D: ATP, nir, bf, pl, p

• 990419-JMR-CET-BrightField.tif

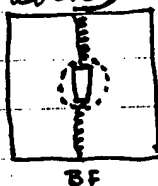
• NO POLARIZED IMAGE COULD BE SEEN.

• 990419-JMR-CET-NIR.tif



PL 765nm
 (PHOTOLUMINESCENCE)

* 003



- LASER SWITCHED TO 0.14W^{0.15} - "HELIX" Q2,2

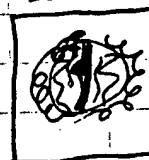
• 990419-JMR-CET-Photoluminescence.tif

• 990419-JMR-CET-003-Snappy.tif

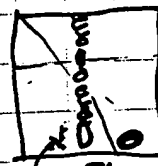
• 990419-JMR-CET-003-BrightField.tif

• 990419-JMR-CET-003-Polarized.tif

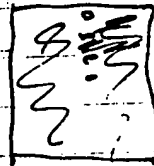
- DEFECT 1



SNAPPY



PL

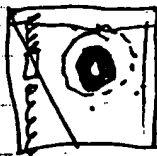


T

- in the vid screen the polarized image can be seen. It appears as a string of light in a long, skinny lighter gray rectangle.

004 Q2,2

"DEFECT A" (ROUND SHAPED DEFECT)



SNAPPY
 Brightfield

• 990419-JMR-CET-004-Snappy.tif

• 990419-JMR-CET-004-Brightfield.tif

• 990419-JMR-CET-004-NIR.tif

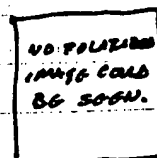
(THE POLARIZED IMAGE COULD NOT BE SEEN)

• 990419-JMR-CET-004-Photoluminescence.tif

* NOTED - THE DATA SET WAS TAKEN TWICE AND THE

SAMPLE DEVELOPED A "BURNT SPOT" BY THE END OF

THE SECOND ACQUISITION.



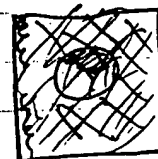
P



NIR 875nm



Snappy
 (LASER STILL)



PL

Continued on Page

Read and Understood By

Juhana M. Rinta.
 Signed

4/13/99
 Date

[Signature]
 Signed

4/13/99
 Date

005

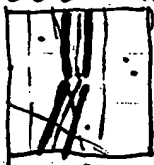
"DEFECT B" Q.2.2



BF

- 990415-JMR-CET-005-Photoluminescence.tif
- 990415-JMR-CET-005-NIR.tif
- 990415-JMR-CET-005-Snap.tif
- 990415-JMR-CET-005-Bright Field.tif
- No Photocopy Polarized image could be seen.

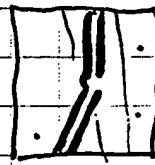
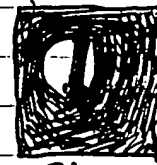
006 Q.2.2



BF

- 990420-JMR-CET-006-BRIGHT FIELD.tif
- 990420-JMR-CET-006-Polarized.tif
- 990420-JMR-CET-006-NIR.tif
- 990420-JMR-CET-006-Snap.tif
- 990420-JMR-CET-006-Photoluminescence.tif

BF2 B+39 C+80

P
(LINE COULD ONLY
BE SEEN ON THE
MONITOR, NOT THE PHOTOGRAPH)NIR
840nmPL
835nm

POLARIZED 2 B+81 C+37 (LINE COULD NOT BE SEEN ON THE IMAGE, ALTHOUGH THE LINE COULD BE SEEN ON THE MONITOR)

*SWEEP FOR NIR CHANGED TO 830-950. Photoluminescence REMAINS AT 700-950.

007 Q.3.0

-HEAVY, THICK "TWIG" LIKE STRUCTURES AND A DEFECT "PARAMECIUM" LIKE



BF

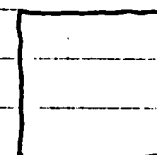
NIR 840nm

- 990420-JMR-CET-007-Bright Field.tif
- 990420-JMR-CET-007-Polarized.tif
- 990420-JMR-CET-007-NIR.tif
- 990420-JMR-CET-007-Snap.tif
- 990420-JMR-CET-007-Photoluminescence.tif

2-B+74 C+85



P

NIR
840nm
VERY DIM IMAGE.CONFIGURATION UPDATE

- [JMR] EXPOSURE TIME: 3 SEC ; ROI 100-511 ; OBJECTIVE MAGNIFICATION: 20X
SWEEP: 830-950 ; STEP: 5 ; BINNING: 2X 2Y ; LEFT MANUAL CONTROL: 830.
- [PL] EXPOSURE TIME: 10 SEC ; ROI 100-511 ; OBJECTIVE MAGNIFICATION: 20X
SWEEP: 700-⁹⁵⁰~~850~~ ; STEP 5 ; BINNING: 2X 2Y ; LEFT MC: 700

Continued on Page

56

Read and Understood By

Juliana M. Ribar

Signed

4/20/99

Date

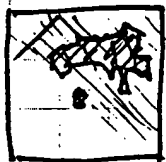
JMR

Signed

4/20/99

Date

008 LARGE DEFECT. - BLUE-WH IN COLOR. ***

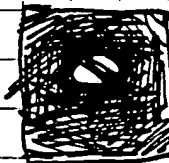
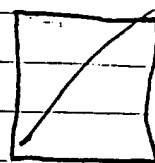


BF

- 990420-JMR-CET-008-Brightfield.tif
- 990420-JMR-CET-008-Polarized.tif
- 990420-JMR-CET-008-NIR.tif
- 990420-JMR-CET-008-SnapPy.tif
- 990420-JMR-CET-008-Photoluminescence.tif



P

NIR
845nm

PL

009 TWO LINES IN THE MIDDLE OF A LARGE "HELIX" PATTERN.

DEFECT 1

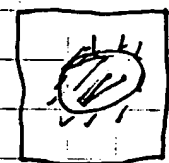


BF

- 990420-JMR-CET-009-BrightField.tif
- 990420-JMR-CET-009-Polarized.tif
- 990420-JMR-CET-009-NIR.tif • COS 905nm
- 990420-JMR-CET-009-SnapPy.tif
- 990420-JMR-CET-009-Photoluminescence.tif • COS 825



P



SnapPy

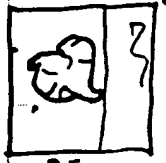
830nm
PL

POLARIZED BRIGHTNESS CHANGED TO 466, CONTRAST TO 400

"COTTON BALLS"

010 LARGE DEFECT - OBJECT APPEARS TO HAVE DEPTH. DIFFERENT LAYERS CAN BE FOCUSED. Q. 2,2

* OBJECT SHINES BRIGHTLY WHEN POLARIZED



BF

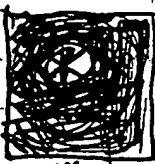
- 990420-JMR-CET-010-BrightField.tif
- 990420-JMR-CET-010-Polarized.tif
- 990420-JMR-CET-010-NIR.tif
- 990420-JMR-CET-010-SnapPy.tif
- 990420-JMR-CET-010-Photoluminescence.tif



P



NIR 855nm

840nm
PL

★ DAMAGE BY THE LASER NOTED. THE DAMAGE TO THE DEFECT LOOKS SIMILAR TO THE DARK SPOT IN THE NIR IMAGE. LASER WATTAGE WILL BE LOWERED TO 0.10W

Q. 2,3 - HUGE COTTONBALL LIKE DEFECT NOTED.

Continued on Page

57

Read and Understood By

Juliana M. Ribar
Signed

4/20/19
Date

[Signature]
Signed

4/20/19
Date

011 HUGE DEFECT - "COTTON BALL" TYPE.

Q. 2,3

DEFECT 2

BF

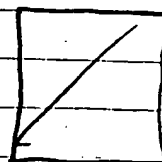
- 990420-JMR-CET-011-Brightfield.tif
- 990420-JMR-CET-011-Polarized.tif
- 990420-JMR-CET-011-NIR.tif
- 990420-JMR-CET-011-Photoluminescence.tif
- 990420-JMR-CET-011-Snappy.tif

BRIGHTFIELD ADJUSTED - BRIGHTNESS $+29$, CONTRAST $+15$ 

P



NIR 855nm



*NOTED - THE LASER ON THIS SPOT. BURNED MADE A SLIGHT BURN AT JUST 0.10W. THIS COULD BE DUE TO A VARIATION IN THE COMPOSITION OF THE STRUCTURE. THE LASER WILL BE PLACED AT 0.10W FOR THESE DEFECTS AND 0.14W FOR ALL OTHER DEFECTS.

012 CRYSTALLINE DEFECTS.

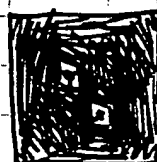
Q. 3,1

0.14W



BF

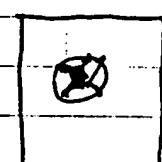
- 990420-JMR-CET-012-BRIGHTFIELD.tif
- 990420-JMR-CET-012-Polarized.tif
- 990420-JMR-NIR.tif
- 990420-JMR-Photoluminescence.tif



P



NIR 850



PL

*LASER BURN WAS NOTED. WATTAGE BEING DROPPED TO 0.10W.

013 DEFECT IMBEDDED IN DEEP SCRATCHES. * (INTERESTING)

Q. 4,1

DEFECT 3

BF.

- 990420-JMR-CET-013-Brightfield.tif
- 990420-JMR-CET-013-Polarized.tif
- 990420-JMR-CET-013-NIR.tif 855nm
- 990420-JMR-CET-013-Photoluminescence.tif
- 990420-JMR-CET-013-Snappy.tif

BRIGHTFIELD 2 B+16, C+11; POLARIZED 2 B+39, C+12



P



NIR 850nm



* PL DIFFERENT FROM THE USUAL

014 DEFECT IMBEDDED IN DEEP SCRATCHES

* (INTERESTING - STRUCTURE) Q. 4,1



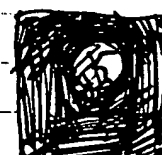
- 990420-JMR-CET-014-Brightfield.tif
- 990420-JMR-CET-014-Polarized.tif
- 990420-JMR-CET-014-NIR.tif
- 990420-JMR-CET-014-Photoluminescence.tif
- 990420-JMR-CET-014-Snappy.tif



NIR 950nm



P



PL 785

Continued on Page

58

Read and Understood By

Jahiana M. Eilan
Signed

4/20/99
Date

[Signature]
Signed

4/20/99
Date

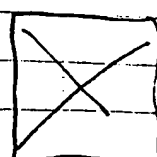
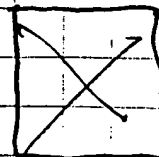
UNETCHED SAMPLE

001



BF

- 990422-JMR-C2T-001-Brightfield.tif
- 990422-JMR-C2T-001-Polarized.tif



*COMPUTER CRASHED. THIS DATASET COULD NOT BE FINISHED.

THIS DATA WAS ERASED AND A NEW SPOT WAS CHOSEN.

DEFECT #	
1	007
2	002
3	003
4	004
5	005

002 ON

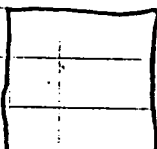
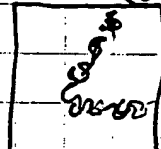


HELIX PATTERN IN AN "L" FORMATION.

- 990422-JMR-C2T-001-Brightfield.tif
- 990422-JMR-C2T-001-Polarized.tif
- 990422-JMR-C2T-001-NIR.tif • NIR-alloy.tif
- 990422-JMR-C2T-001-Photoluminescence.tif • PL-alloy.tif
- 990422-JMR-C2T-001-Snappy.tif

DEFECT 1, BIREFRINGENT. LATTICE SHAPED DEFECT.

Q.2.3



BF

P

• 417nm/pixel

002

SCRATCHES



BF

- 990422-JMR-C2T-002-Brightfield.tif
- 990422-JMR-C2T-002-Polarized.tif



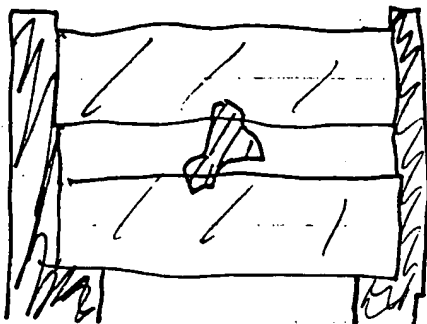
THIS DATASET WAS ERASED.

IT WAS NOTICED THAT THE IMAGE WASN'T PERFECTLY COLDER ILLUMINIZED. CHRIS

ADJUSTED THE MICROSCOPE AND DUSTED AWAY MORE DUST PARTICLES. MEANWHILE,

THE SMALL, FRAGILE C2T SAMPLE SLIPPED OFF THE STAGE AND SHATTERED. A LARGER PIECE

WAS SELECTED TO CONTINUE THE EXPERIMENT. THIS NEW PIECE WAS PLACED ON TWO PYREX SLIDES...



THE DATA WAS TAKEN ON A PORTION OF THE C2T SAMPLE NOT UNDER THE GLASS SLIDES.

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Continued on Page

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Jahana M. Pilon

Signed

4/22/99

Date

JMR

Signed

4/22/99

Date



BF

002 LAR

• 990422 JMR-C2T-002-Brightfield. E:f

• 990422 JMR-C2T-002-Polarized. E:f 2-B + 71, C:f

• 990422 JMR-C2T-002-NIR. E:f

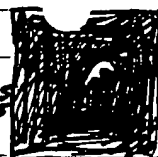
• 990422 JMR-C2T-002-Snappy. E:f

• 990422 JMR-C2T-002-Photoluminescence. E:f

A LARGE DEFECT.

TYPE 2-AMORPHOUS DEFECT.

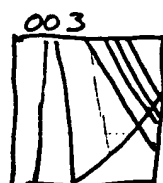
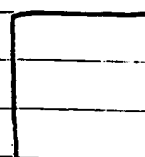
Q.3, 4



P



NIR



BF

003

SHALLOW SCRATCHES

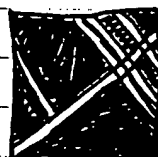
• 990422 JMR-C2T-003-Brightfield. E:f

• 990422 JMR-C2T-003-Polarized. E:f

• 990422 JMR-C2T-003-NIR. E:f Q. 2, 1

• 990422 JMR-C2T-003-Photoluminescence. E:f

• 990422 JMR-C2T-003-Snappy. E:f

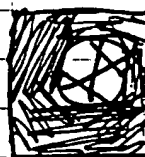


P



890nm

NIR

TL
825nm.

BF

004

2 SCRATCHES CONVERGING

• 990422 JMR-C2T-004-Brightfield. E:f

• 990422 JMR-C2T-004-Polarized. E:f

• 990422 JMR-C2T-004-NIR. E:f Q. 3, 2

• 990422 JMR-C2T-004-Snappy. E:f

• 990422 JMR-C2T-004-Photoluminescence. E:f



P



NIR 920nm



BF

005

TWO DEEP SCRATCHES

• 990422 JMR-C2T-005-Brightfield. E:f

• 990422 JMR-C2T-005-Polarized. E:f

• 990422 JMR-C2T-005-NIR. E:f Q. 4, 3

• 990422 JMR-C2T-005-Photoluminescence. E:f

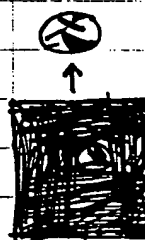
• 990422 JMR-C2T-005-Snappy. E:f



P



NIR 895nm



PL 780nm

Continued on Page

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MICROSCOPE SET UP INFO.

MODE	DIRECTION OF LIGHT	LAMP ON/OFF	LASER ON/OFF	SOFTWARE USED	MICRO SETTINGS
RGB NIR		NO FILTERS	ON	OFF	AQ.M.
BF		NO FILTERS	ON	OFF	SNAPPY
Polarized		FILTERS	ON	OFF	SNAPPY
PHOTO LUMINESCENCE		NO FILTERS	OFF	ON	AQM
LASER DOT "SNAPPY"		NO FILTERS	OFF	ON	SNAPPY

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Continued on Page _____

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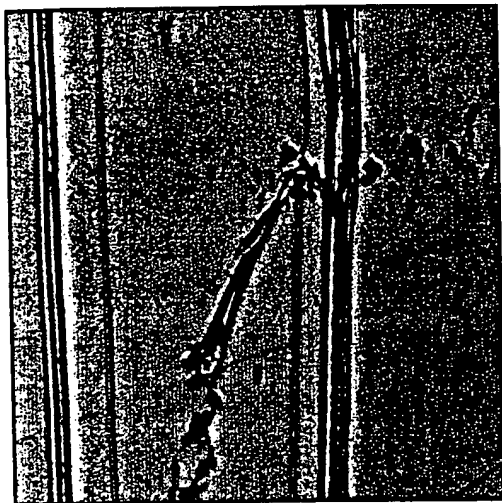
4/22/99
Date

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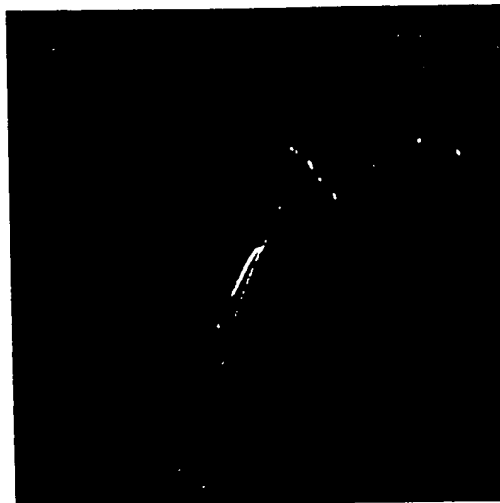
4/22/99
Date

Project Title: Chemical Imaging for Semiconductor Metrology
Project No.: 98ATP01
Date: May 24, 1999

Brightfield and Polarized Images of Etched CZT Defect 1

133.4 μm **Parameters**

Sample Identification: Etched
Position: Quadrant 3,3
Type: Brightfield
Objective: 20X
Comments: The defect has a lattice like structure.
Source: Tungsten Lamp

133.4 μm **Parameters**

Sample Identification: Etched
Position: Quadrant 3,3
Type: Polarized
Objective: 20X
Observations: The defect is more birefringent at some points than at others.
Source: Tungsten Lamp



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~~Page 1~~

Continued on Page _____

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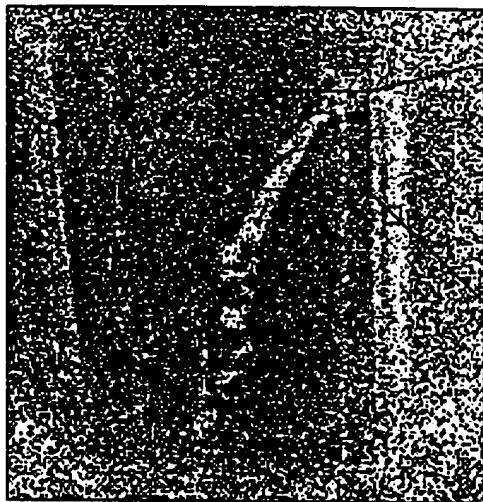
Juliana M. Pilon
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Date

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Signed

4/23/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 1

133.4 μm **Parameters**

Sample Identification: Etched

Position: Quadrant 3,3

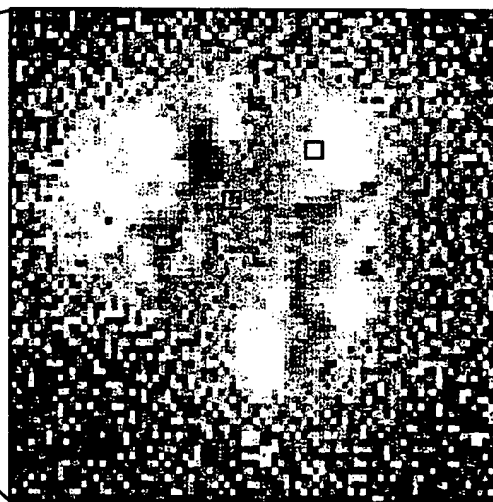
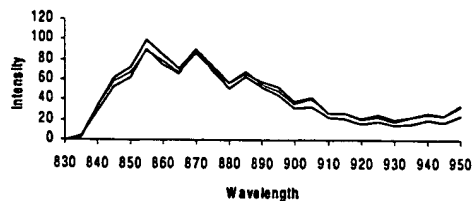
Type: NIR

Wavelength: 905 nm

Objective: 20X

Observations: The defect has a similar spectrum to the large lines to its right and a different spectrum from the surrounding area.

Source: Tungsten Lamp

16.76 μm **Parameters**

Sample Identification: Etched

Position: Quadrant 3,3

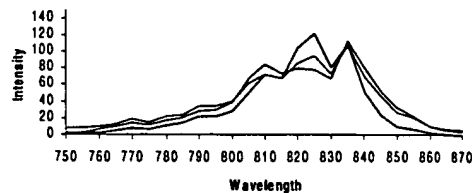
Type: Photoluminescent

Wavelength: 825 nm

Objective: 20X

Observations: Spectral variations were noticed between points taken in the dark, gray and light regions.

Source: Tungsten Lamp



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Page 2

Continued on Page

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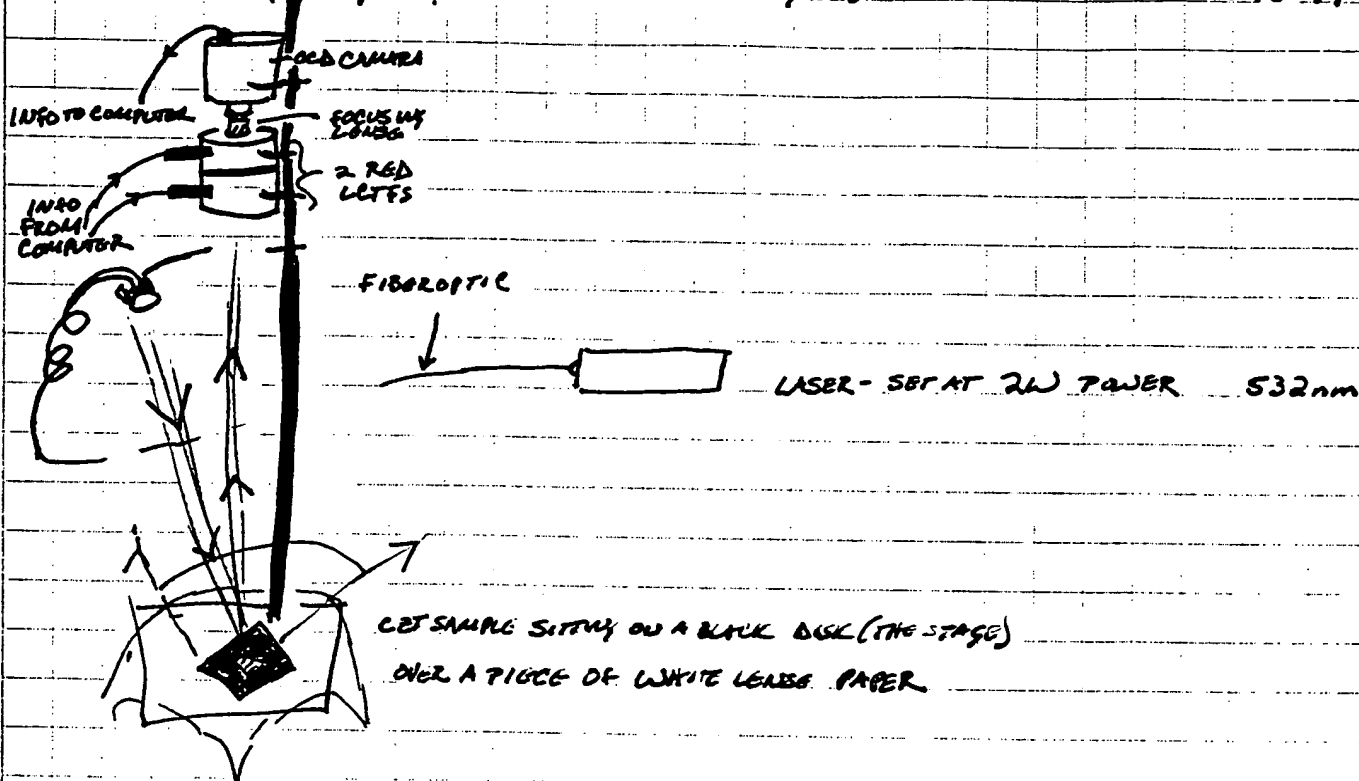
[Signature]
Signed

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Date

MACRO IMAGING SCHEMATIC

GREEN

5-10-99



PRELIMINARY OBSERVATIONS

- 25s. ACQUISITION TIME WAS ADDED TO ~~FOOD~~ FLUORESC
- AT ~~885~~ 885nm THE DETAILS IN THE SAMPLE BECAME APPARENT.



860nm ²⁵ 25s. SOME DETAILS BECAME VISIBLE
865 - NOT AS STRONG



870nm x 865 - LARGER SPOT VIBRY EVIDENT.

★ ETCHED CBT BROKE 5-12-99

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Continued on Page

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5/14/99
Date

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5/14/99
Date

PROJECT 1985 CSEM - Macro System

MACRO IMAGING SCHEMATIC

5-12-99

CCD CAMERA

CAMERA LENS
MAGNIFYING LENS
HOLOGRAPHIC
FILTERCAMERA CCD.
1317 X0.2 OPTICS
FIBER OPTICFIBER OPTIC WAS VIBRATED
SLIGHTLY TO SPREAD
THE LASER LIGHT, REDUCING
GRAININESS.

6 1/2"

LASER

BLACK
BOX

CET SAMPLE

CAMERA LENS - FUJINON TV ZOOM LENS 1/2.5X

MAGNIFICATION LENSES - 1/2 X (4X + 4X + 1X + 2X)

(MAGNIFYING LENSES SCREW
ON TO THE CAMERA LENS)

LASER: 532nm GREEN LASER.

CAMERA CCD: 1317-KL PRINCETON INSTRUMENTS INC.

PLATFORM: 2.25" FROM GROUND

0.2 OPTICS: 6.5" FROM GROUND

HOLOGRAPHIC FILTER: 5.5" FROM GROUND

FILTER: 660nm HOLOGRAPHIC FILTER.

EXPOSURE TIME: 25 SEC.

LAB 1 // ATP PHOTOIMAGING LAB

990512-001 - ETCHED CET MICRO

PHOTOLUMINESCENT IMAGE OF ETCHED CET.

W/ FILTER IN A DARK ROOM - LASER ON
VIEW
USING WIN ~~SP~~ (AQM NOT COUNTABLE)
THIS CCD.

990512-002 - ETCHED CET MICRO

CONFIGURATION
SAME ~~FRAME~~ BUT W/ NO LASER -
W/ THE LIGHTS ON.

990512-003 - ETCHED CET MICRO

SEMI WHITE LIGHT - ROOM LIGHT + 660nm ~~W/~~ PASS FILTER

Continued on Page

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Jharna M. Riba 5/12/99

Date

JMT

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5/12/99

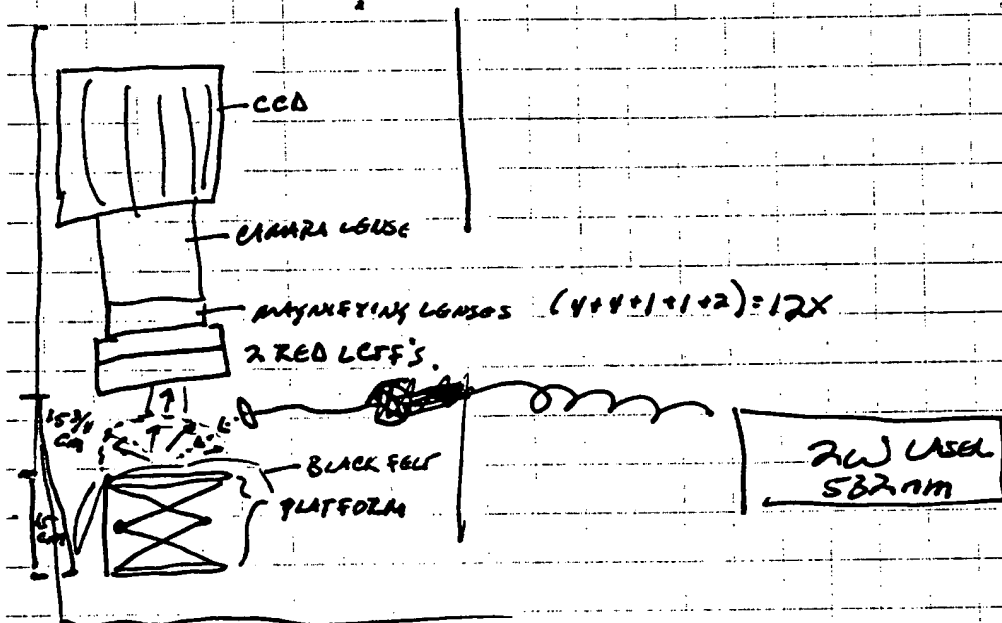
Date

PROJECT Chism - Macro system

110512-ETCHED C2T MACRO-004- LASER ON - DARK ROOM.
110512-ETCHED C2T MACRO-005- RESOLUTION TARGET.

MAY 13, 1999.

MACRO SYSTEM CONFIGURATION:



ETCHED C2T USED.

110513-006-
110513-1 MACRO RESTARTS * RESOLUTION TARGET FOR THIS SYSTEM CONFIGURATION
SERIES - 2, ITEM 1

5-14-99

CCD DETECTOR - KODAK 1035 X1317 SHOT TYPE: LINE * LASER: 532nm 2W
SERIAL: 40 (READ-1025) MAGNIFICATION: 7X (4X+2X+1X)

INITIATION TIME: 25 SEC. NO ROI

LCTF TUNING: 680-700nm RED LCTF MANUAL SET: 680nm STEP SIZE: 10

ROI - CLEAR. (IF NOT CLEAR, THE BURNING WORKS WORK.)

CAMERA: SET AT SIXX STARTER FRONT ILLUM ADCTYPE - FAST READ OUT MODE: FULL FRAME

* SCOTT ADDED A NEW VERSION OF ACQUISITION MANAGER.

THE NEW VERSION (4.8V) WAS USED TO COLLECT THIS DATA.

Continued on Page

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Date

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Date

Brightfield and Polarized Images of Etched CZT Defect 3



Parameters

133.4 μm

Sample Identification: Etched

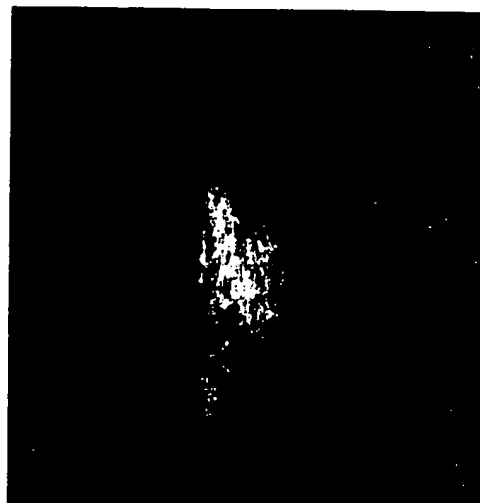
Position: Quadrant 4,1

Type: Brightfield

Objective: 20X

Observations: an amorphous defect
at the junction of two sets of deep
scratches.

Source: Tungsten Lamp



Parameters

133.4 μm

Sample Identification: Etched

Position: Quadrant 4,1

Type: Polarized

Objective: 20X

Observations: The defect is
birefringent but the scratches are
not.

Source: Tungsten Lamp



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Continued on Page

Read and Understood By

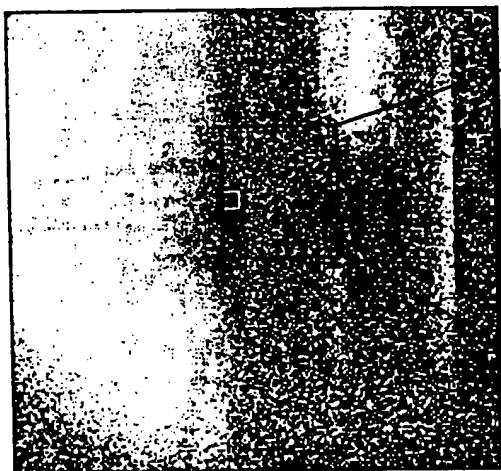
Juliana M. Ribon
Signed

5/24/99
Date

JMR
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 3

**Parameters**42.7 μm

Sample Identification: Etched

Position: Quadrant 4,1

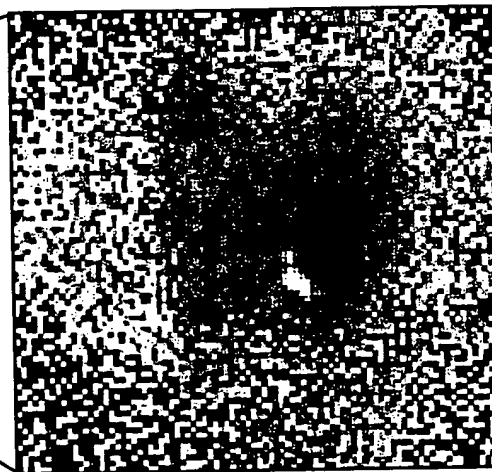
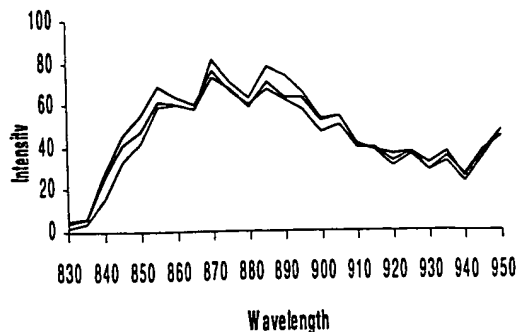
Type: NIR

Wavelength: 855 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

**Parameters**29.19 μm

Sample Identification: Etched

Position: Quadrant 4,1

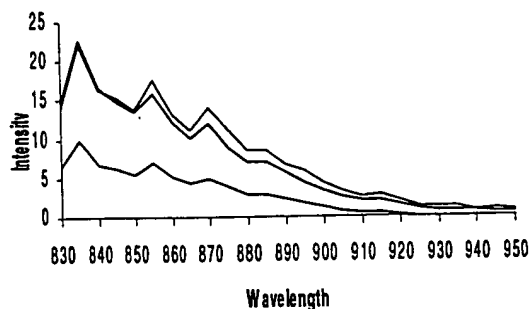
Type: Photoluminescent

Wavelength: 805 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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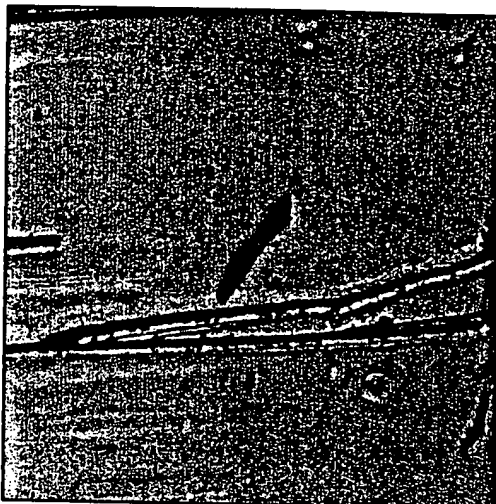
5/29/99
Date

J. P. Pilon
Signed

5/29/99
Date

Continued on Page

Brightfield and Polarized Images of Etched CZT Defect 4



133.4 μ m

Parameters

Sample Identification: Etched

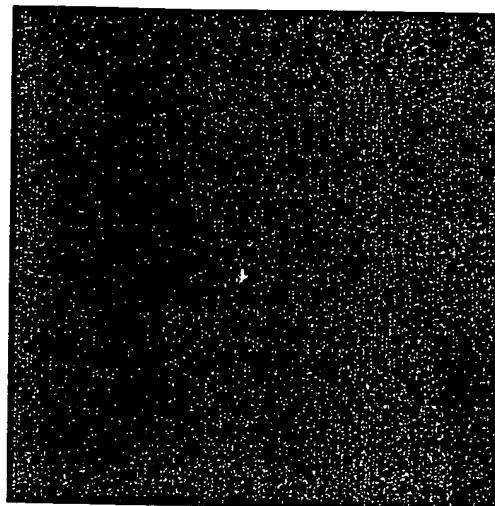
Position: Quadrant 3,0

Type: Brightfield

Objective: 20X

Observations: The defect appears as two converging scratches and an amorphous defect superior to the scratches.

Source: Tungsten Lamp



133.4 μ m

Parameters

Sample Identification: Etched

Position: Quadrant 3,0

Type: Polarized

Objective: 20X

Observations: Only a portion of the amorphous defect is birefringent.

Source: Tungsten Lamp



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Continued on Page _____

Read and Understood By

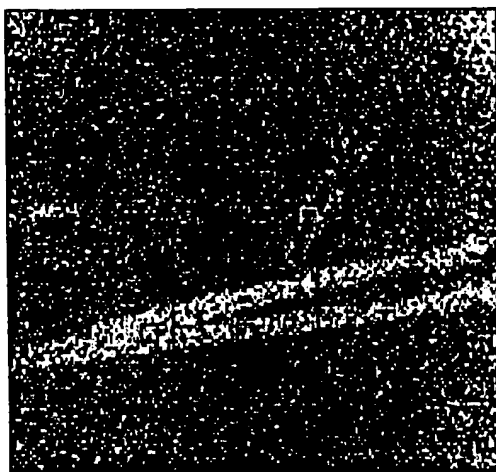
Julian M. Pilon
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Date

[Signature]
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 4

**Parameters**33.4 μm

Sample Identification: Etched

Position: Quadrant 3,0

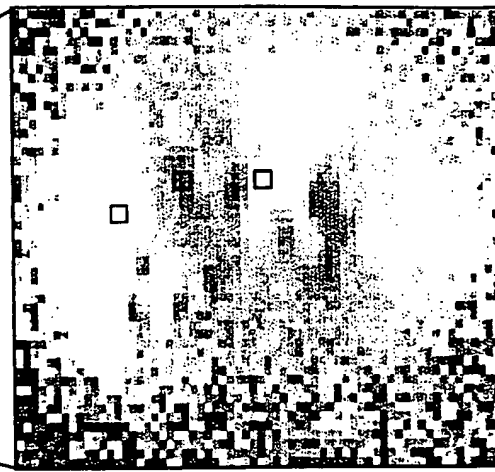
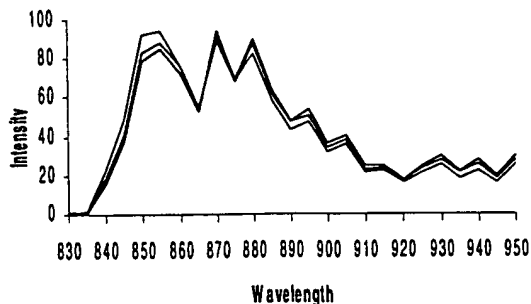
Type: NIR

Wavelength: 905 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

**Parameters**12.9 μm

Sample Identification: Etched

Position: Quadrant 3,0

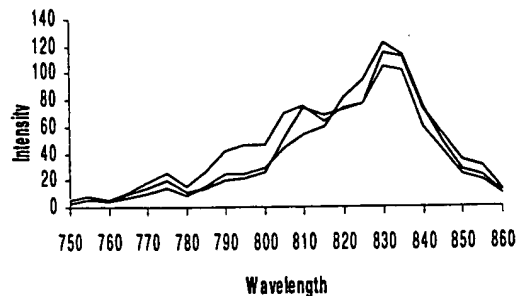
Type: Photoluminescent

Wavelength: 810 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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Continued on Page _____

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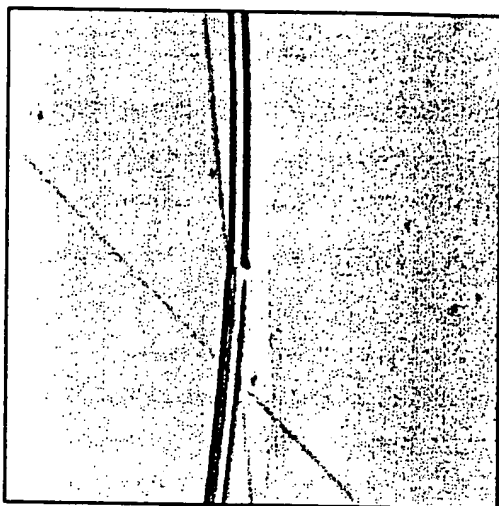
Juliana M. Pilar
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Date

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Signed

5/24/99
Date

Brightfield and Polarized Images of Etched CZT Defect 5



133.4 μm

Parameters

Sample Identification: Etched

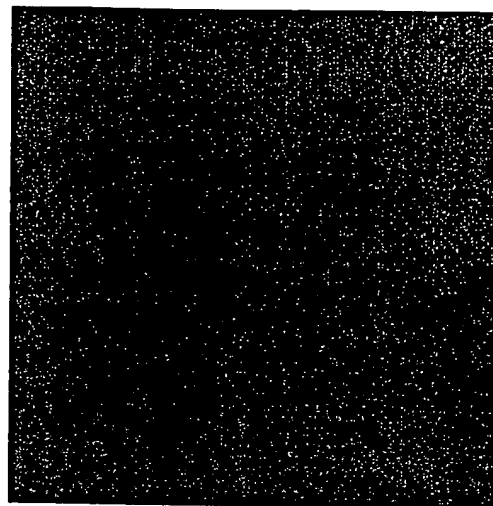
Position: Quadrant 2,2

Type: Brightfield

Objective: 20X

Observations: The defect appears
as two deep scratches.

Source: Tungsten Lamp



133.4 μm

Parameters

Sample Identification: Etched

Position: Quadrant 2,2

Type: Polarized

Objective: 20X

Observations: The image doesn't
reflect the birefringent nature of the
diagonal scratch across the bottom
left corner.

Source: Tungsten Lamp



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~~Page 9~~

Continued on Page _____

Read and Understood By

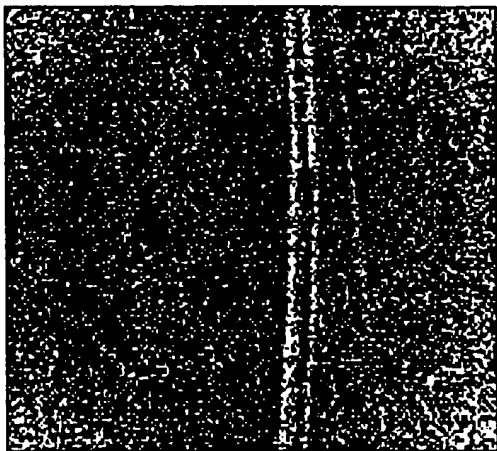
Juliana M. Pizar
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5/24/99
Date

[Signature]
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 5

38.8 μm **Parameters**

Sample Identification: Etched

Position: Quadrant 2,2

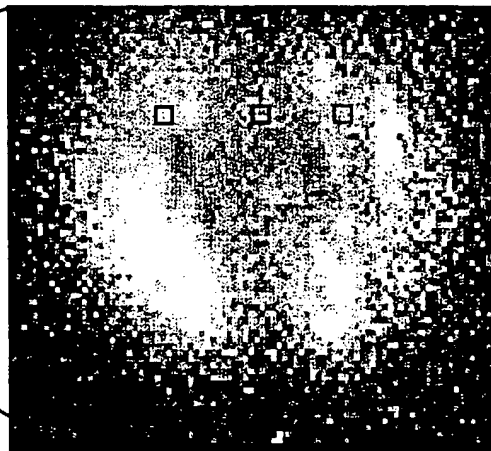
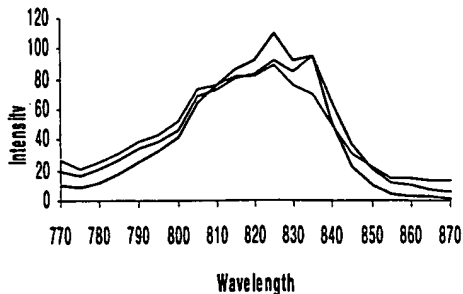
Type: NIR

Wavelength: 910 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

14.6 μm **Parameters**

Sample Identification: Etched

Position: Quadrant 2,2

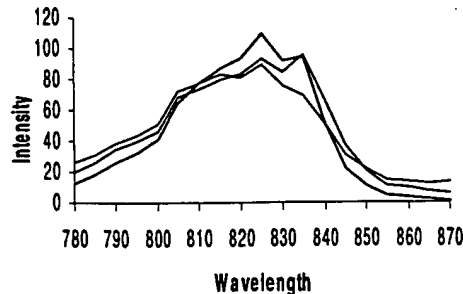
Type: Photoluminescent

Wavelength: 815 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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Continued on Page _____

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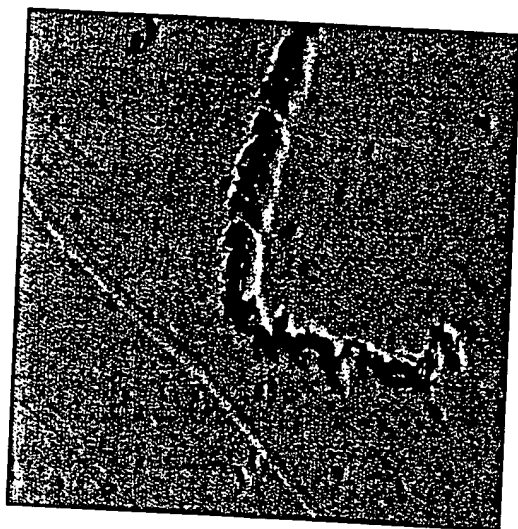
Juliana M. Khar
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5/24/19
Date

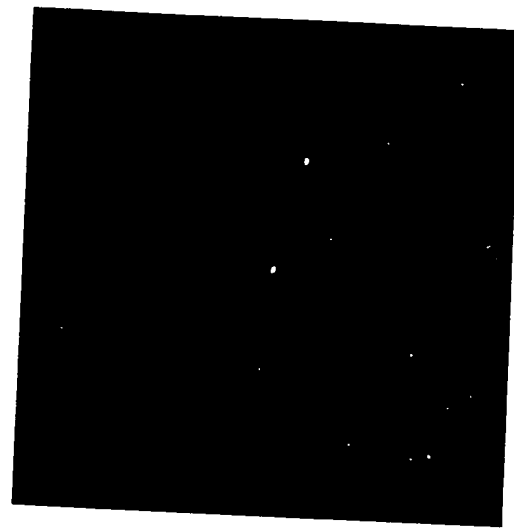
[Signature]
Signed

5/24/19
Date

Brightfield and Polarized Images of Unetched CZT Defect 1

133.4 μm **Parameters**

Sample Identification: Unetched
Position: Quadrant 2,3
Type: Brightfield
Objective: 20X
Comments: The defect has a
lattice like structure.
Source: Tungsten Lamp

133.4 μm **Parameters**

Sample Identification:
Unetched
Position: Quadrant 2,3
Type: Polarized
Objective: 20X
Observations: The defect
is more birefringent at some
points
than at others.
Source: Tungsten Lamp



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Page 1

Continued on Page _____

Read and Understood By

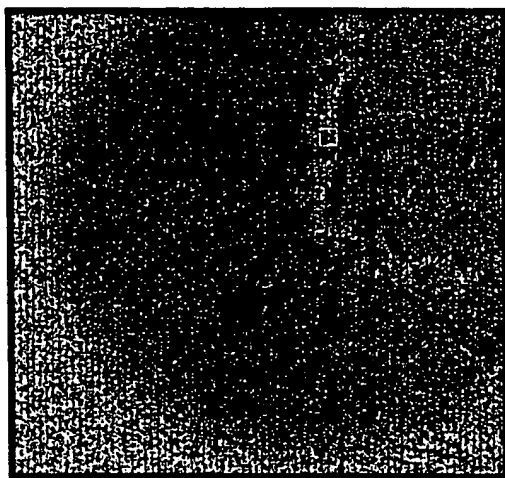
Juliana M. Pilar
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Date

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5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 1

85.7 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 2,3

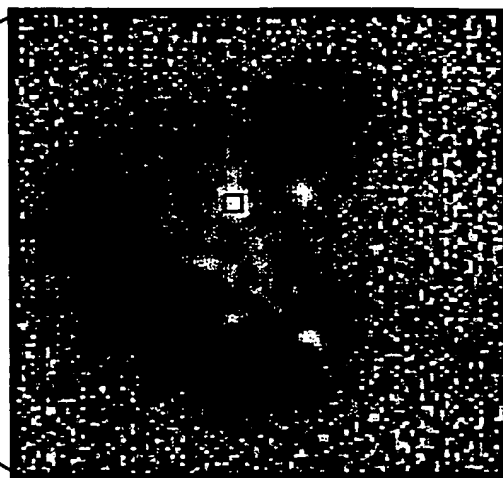
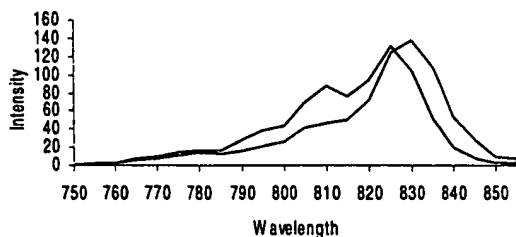
Type: NIR

Wavelength: 920 nm

Objective: 20X

Observations: The defect has
a similar NIR spectrum as the
surrounding area.

Source: Tungsten Lamp

24.8 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 2,3

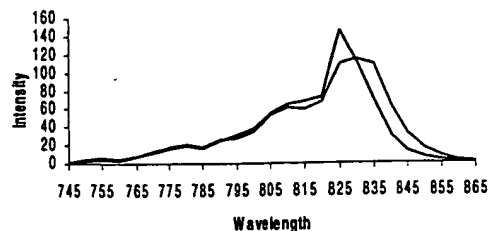
Type: Photoluminescence

Wavelength: 840 nm

Objective: 20X

Observations: A peak-shift change
was noticed between points taken
on and off the defect.

Source: Tungsten Lamp



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Continued on Page

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Juhana M. Pekar
Signed

5/24/99
Date

[Signature]
Signed

5/24/99
Date

Brightfield and Polarized Images of Unetched CZT Defect 2



133.4 μ m

Parameters

Sample Identification: Unetched

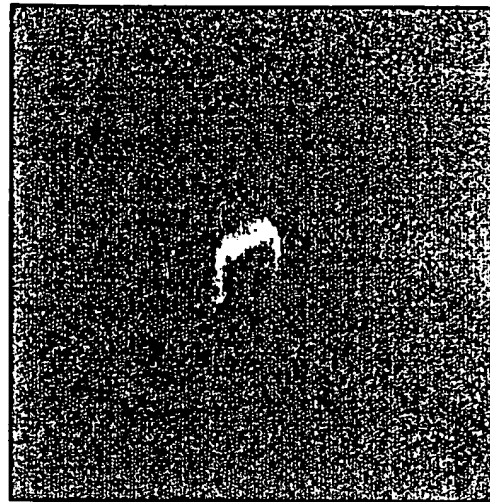
Position: Quadrant 3,4

Type: Brightfield

Objective: 20X

Observations: The defect has an amorphous shape.

Source: Tungsten Lamp



133.4 μ m

Parameters

Sample Identification: Unetched

Position: Quadrant 3,4

Type: Polarized

Objective: 20X

Observations: The defect appears to be birefringent.

Source: Tungsten Lamp



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Continued on Page _____

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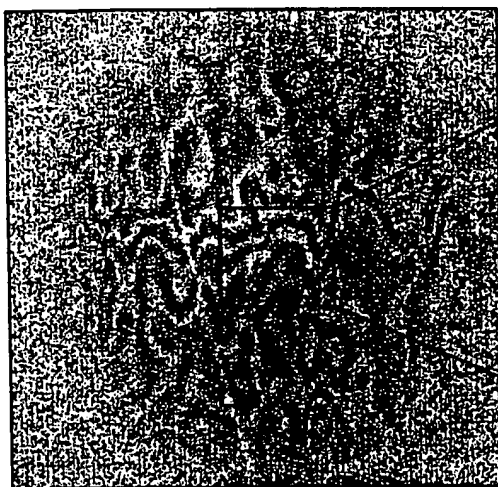
Juliana M. Ribar
Signed

5/24/99
Date

[Signature]
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 2

40.2 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 3,4

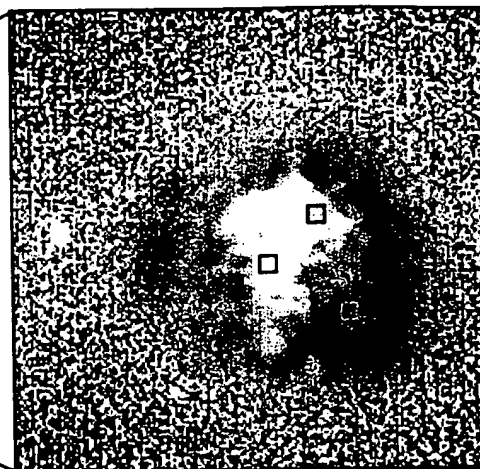
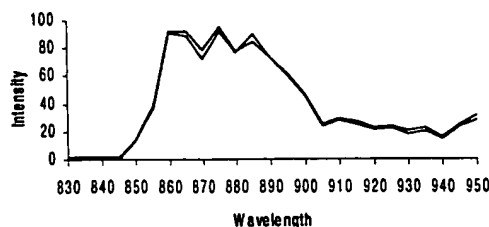
Type: NIR

Wavelength: 950 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

91.7 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 3,4

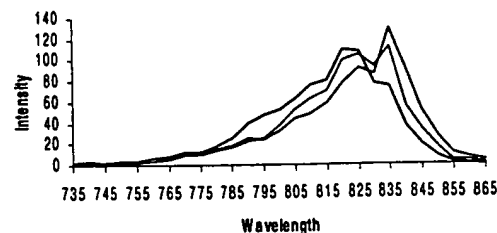
Type: Photoluminescence

Wavelength: 840 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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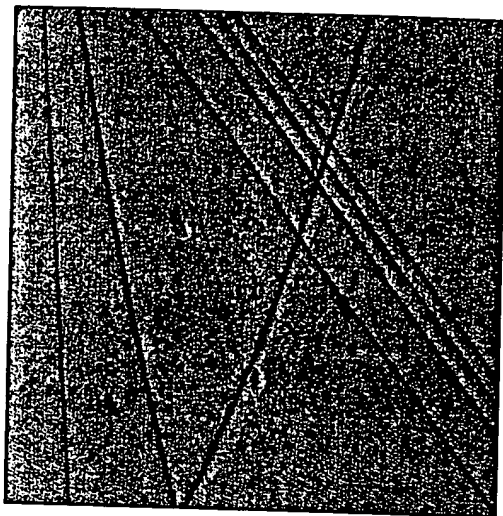
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Continued on Page

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Juliana M. Riber
Signed5/24/99
Date[Signature]
Signed5/24/99
Date

Brightfield and Polarized Images of Unetched CZT Defect 3

133.4 μm **Parameters**

Sample Identification: Unetched

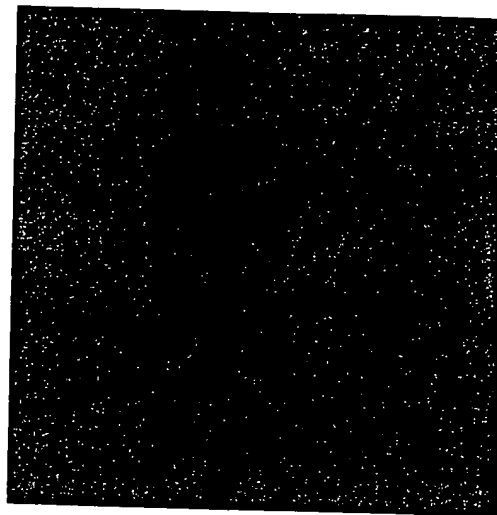
Position: Quadrant 2,1

Type: Brightfield

Objective: 20X

Observations: The defects are seen
as shallow scratches.

Source: Tungsten Lamp

133.4 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 2,1

Type: Polarized

Objective: 20X

Observations: Some of the defects are
birefringent.

Source: Tungsten Lamp



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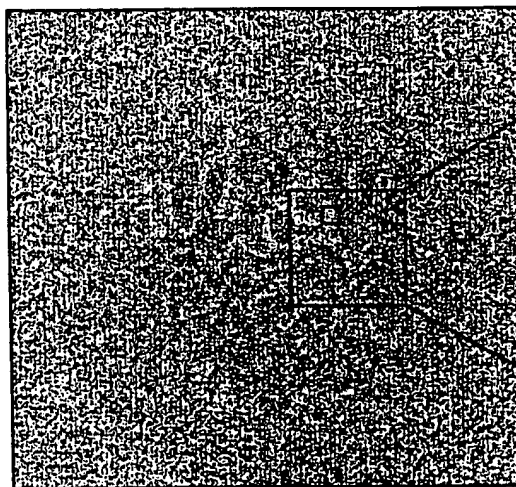
Page 5

Continued on Page _____

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Juliana M. Pilar
Signed5/24/99
DateCM/JS
Signed5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 3



106.5 μm

Parameters

Sample Identification: Unetched

Position: Quadrant 2,1

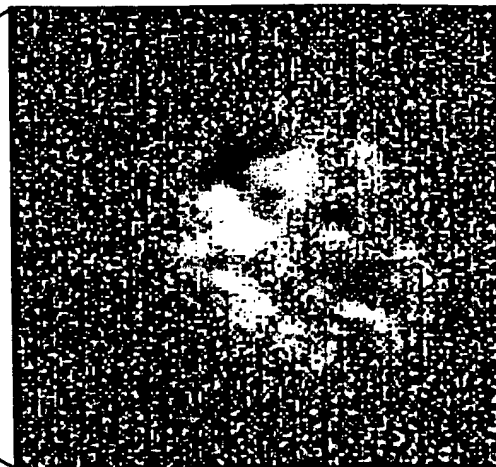
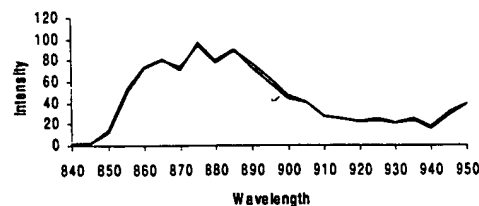
Type: NIR

Wavelength: 935 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



26.0 μm

Parameters

Sample Identification: Unetched

Position: Quadrant 2,1

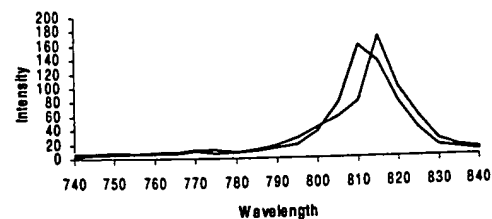
Type: Photoluminescence

Wavelength: 800 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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Continued on Page

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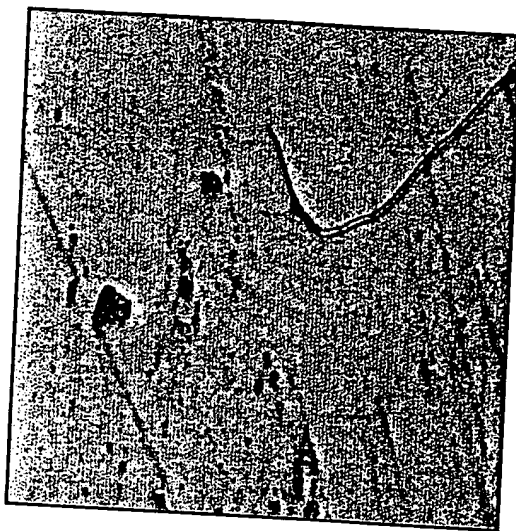
Juliana M. Pizar
Signed

5/24/99
Date

[Signature]
Signed

5/24/99
Date

Brightfield and Polarized Images of Unetched CZT Defect 4

133.4 μm

Parameters

Sample Identification: Unetched

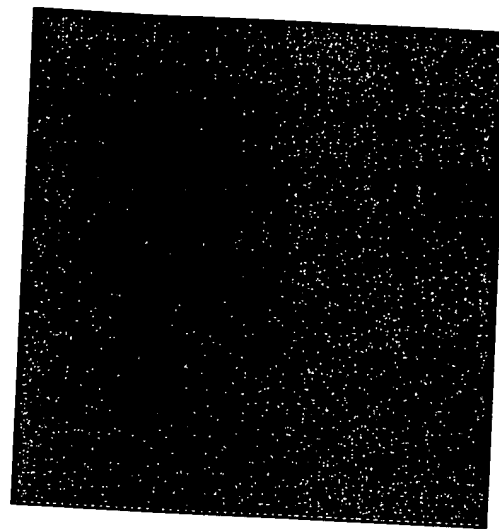
Position: Quadrant 3,2

Type: Brightfield

Objective: 20X

Observations: The defect appears as two converging scratches.

Source: Tungsten Lamp

133.4 μm

Parameters

Sample Identification: Unetched

Position: Quadrant 3,2

Type: Polarized

Objective: 20X

Observations: The scratches are faintly birefringent.

Source: Tungsten Lamp

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Continued on Page

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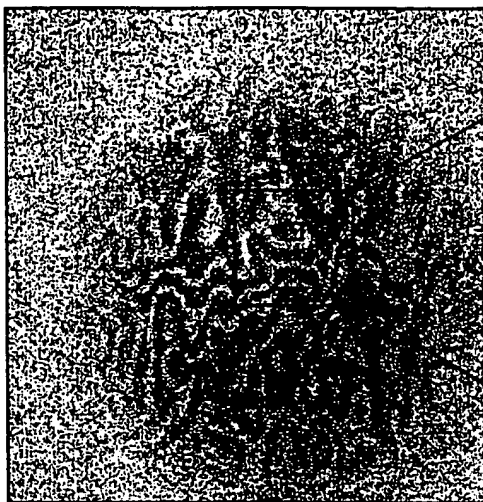
Juliana W. Palar
Signed

5/24/99
Date

[Signature]
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 4

106.5 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 3,2

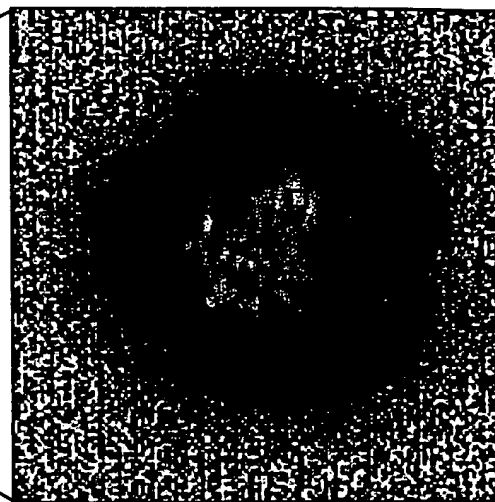
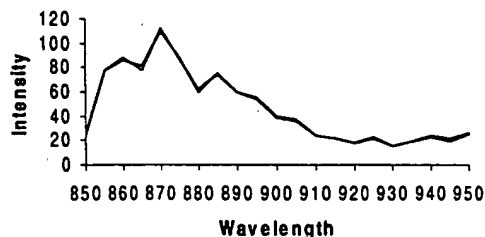
Type: NIR

Wavelength: 950 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

32.3 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 3,2

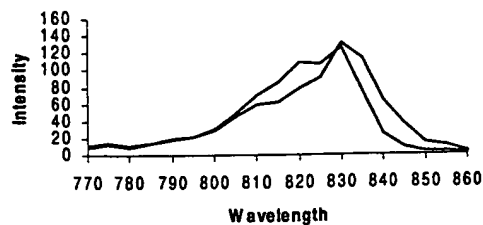
Type: Photoluminescence

Wavelength: 845 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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Continued on Page

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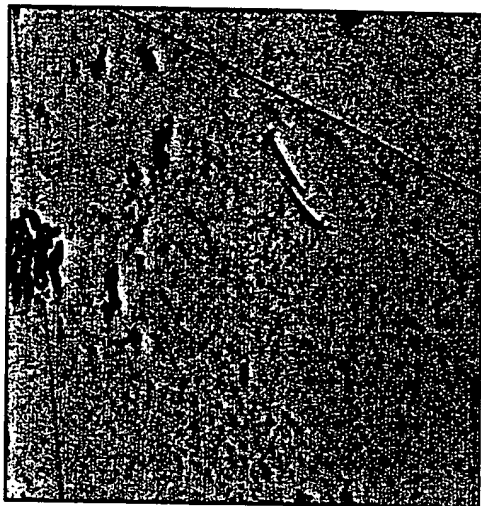
Juliana M. Rilar
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Date

[Signature]
Signed

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Date

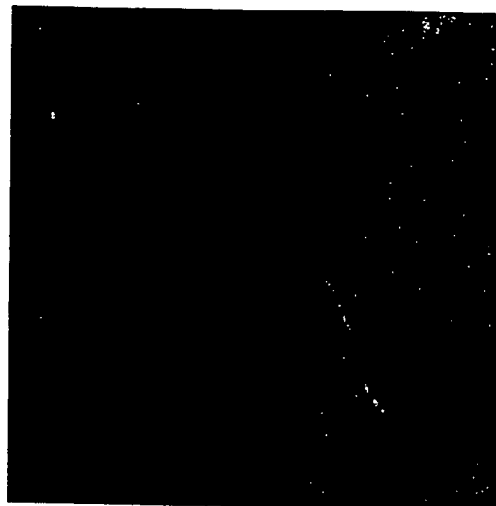
Brightfield and Polarized Images of Unetched CZT Defect 5



133.4 μ m

Parameters

Sample Identification: Unetched
Position: Quadrant 4,3
Type: Brightfield
Objective: 20X
Observations: The defect appears
as two deep scratches.
Source: Tungsten Lamp



133.4 μ m

Parameters

Sample Identification: Unetched
Position: Quadrant 4,3
Type: Polarized
Objective: 20X
Observations: The defect appears to
be birefringent.
Source: Tungsten Lamp

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Continued on Page _____

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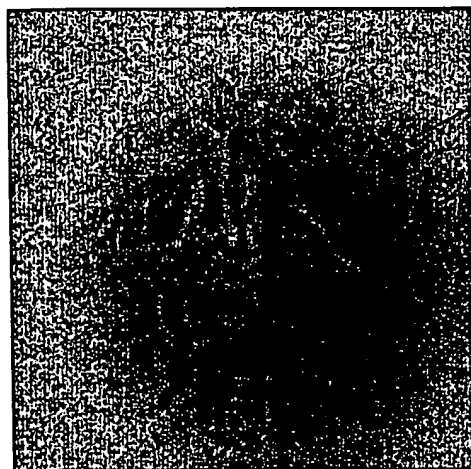
John M. Pilon
Signed

6/24/99
Date

J.M.P.
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 5

106.5 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 4,3

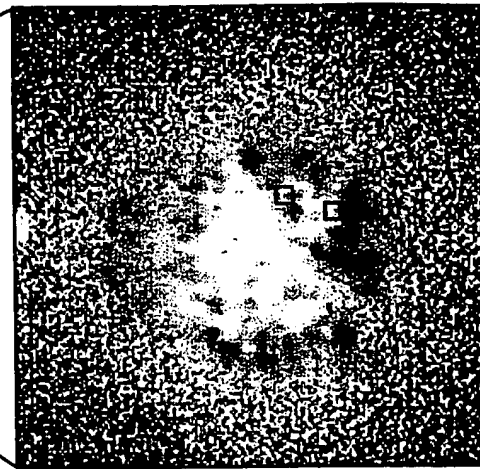
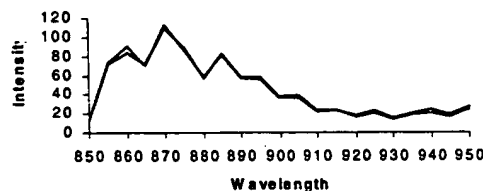
Type: NIR

Wavelength: 940 nm

Objective: 20X

Observations: The defect has
a similar NIR spectrum as the
surrounding area.

Source: Tungsten Lamp

35.6 μm **Parameters**

Sample Identification: Unetched

Position: Quadrant 4,3

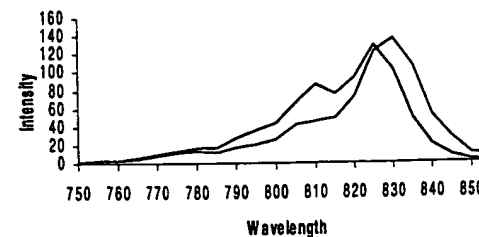
Type: Photoluminescence

Wavelength: 835 nm

Objective: 20X

Observations: A peak-shift change
was noticed between points taken
on and off the defect.

Source: Tungsten Lamp



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Continued on Page

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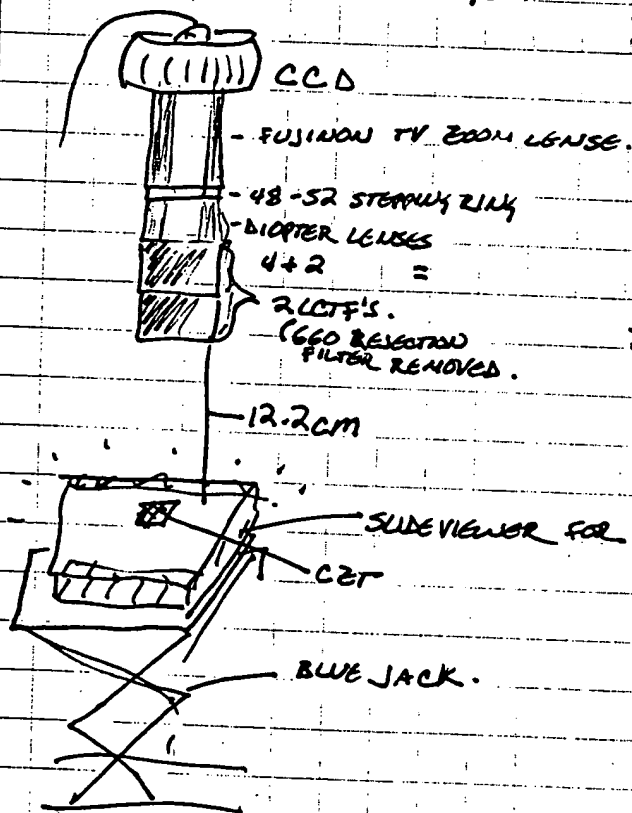
[Signature]
Signed

5/24/99
Date

DATE	#	BLUE JACK	BJ+CET	SPEC 825	LCTF 820	LCTF 825	LCTF 830
0701	010	✓	✓	✓	✓		
0701	011		✓	✓	✓		
0701	012	✓		✓			
0701	013		✓	✓		✓	
0701	014	✓		✓		✓	
0701	015		✓	✓			✓

July 2, 1999

★ CONFIGURATION CHANGE.



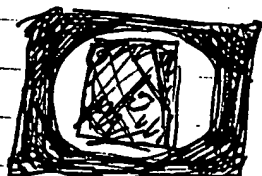
LENS CONFIGURATION

0
0.5 8M
0.5

CET-9688 B-SOAK etch

BLACK ELECTRICAL TAPE USED TO SEAL
THE JOINT BETWEEN THE FUJINON TV ZOOM
LENS AND THE DIOPTR LENSE.

• 790702-jmr-001, SPE



BRIGHT FIELD IMAGE Δt 2 SEC BIXI
LCTF - 800 TUNGSTEN LAMP
CET ON LIGHT BOARD (NOT LIT)

99

Continued on Page

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Juliana M. Wilson.

Signed

07/06/99

Date

[Signature]

Signed

7/6/99

Date

IMAGES 003 (FRONT SIDE OF SAMPLE) AND 007 (BACKSIDE OF SAMPLE) WERE DIVIDED BY 004 - LIGHT SOURCE.

SUMMARY OF IMAGES FOR 190827.

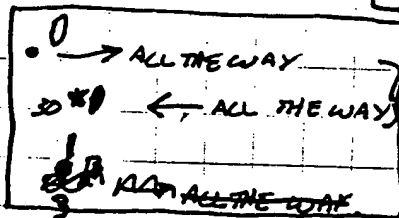
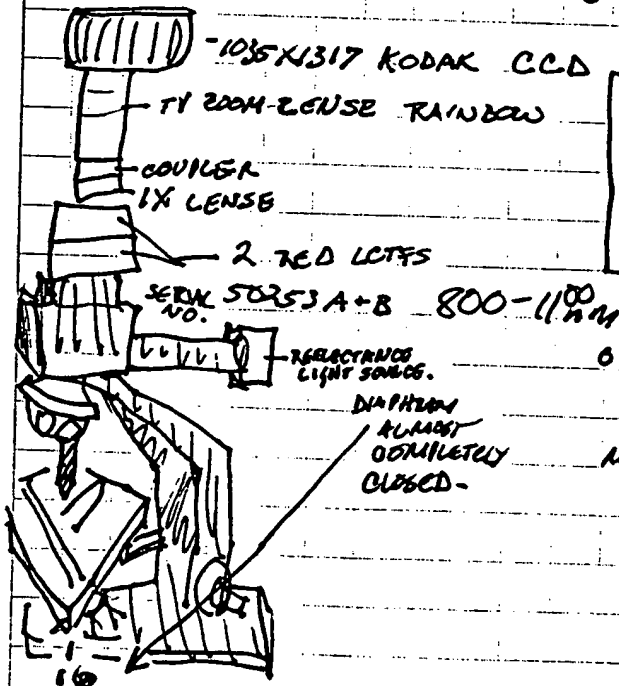
- 001 BRIGHT FIELD REFLECTANCE - 2 TUNGSTEN LAMPS - FRONT OF SAMPLE.
- 002 TRANSMITTANCE 805-865 2nm STEP 1 SEC AT - FRONT. BAD IMAGE.
- 003 002 GOOD VERSION 1 SEC - FRONT *
- 004 LIGHT BOARD ONLY - AT 1 SEC
- 005 AT 500 MS - FRONT
- 006 AT 100 MS - FRONT
- 007 AT 1 SEC BACK SIDE OF SAMPLE (ALSO POLISHED) *
- 008 AT 500 MS - BACK
- 009 AT 100 MS - BACK
- 010 SAMPLE MOVED AT 1 SEC
- 011 RESOLUTION TARGETS.
- 012 BRIGHT FIELD REFLECTANCE. (700nm)

012 - B.F.
003, 007, 008

THE REST OF THE IMAGES WERE PRODUCED THROUGH ANALYSIS OR DIVISION STUDIES.

Microscopy.

Wednesday, September 8, 1999



11-15-99
ALL THE FILES OF 7-8-99
WERE TRANSFERRED TO
MOTHER / SHARED / CLIENTS /
TECHS / CCD
HELPS TO GREATE
A LARGE FIELD OF VIEW.

OBJECTIVE TYPE: OLYMPUS (JAPAN) T9-102328 IC 20
MSP1an 0.46 2/0 F=180
MICROSCOPE: OLYMPUS BH-2

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Continued on Page

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Signed

7/7/99
Date

[Signature]
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9/1/99
Date

LAB 04 / C: / CLIENTS / MICRO /

77

- 990809 - jmi - 001 - RES TARGET. Cit

RESOLUTION TARGET ^{IMAGE} OF MICRO RES TARGET

700 LOTS AT 0.5 SEC - 21°

TRANSMITTANCE. WUVIEW. B4X4

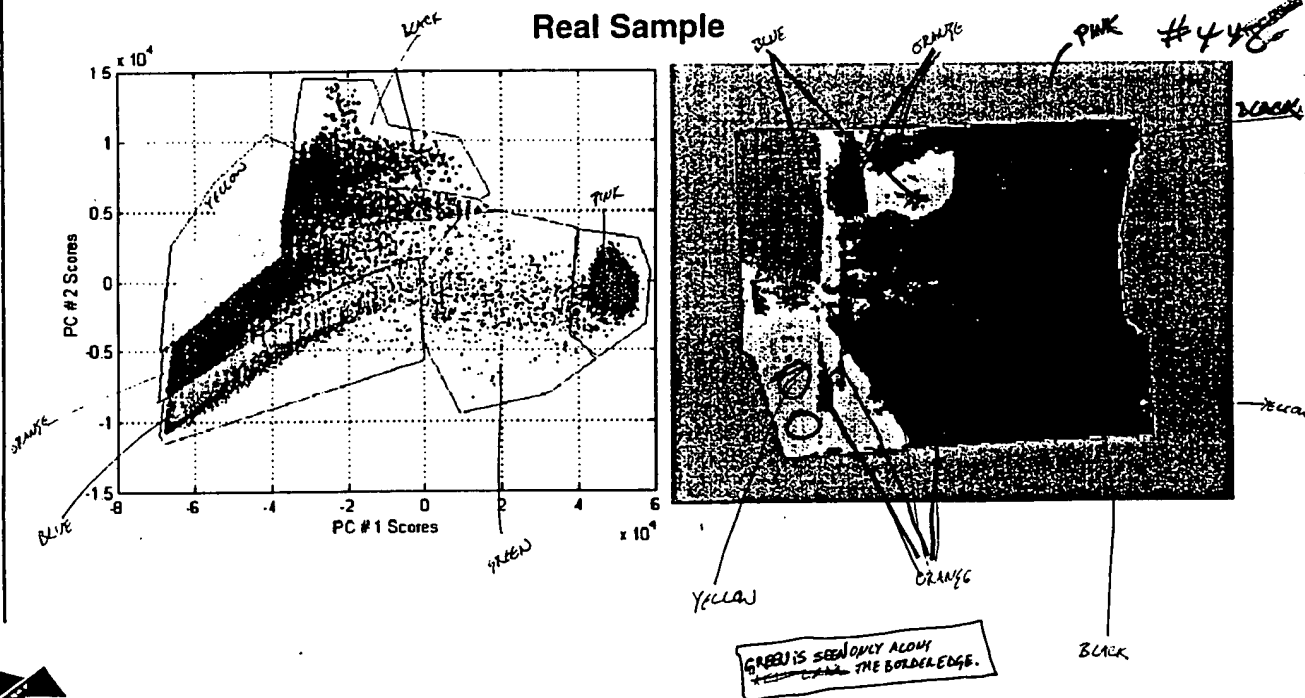
ROI: 1st 1025 131 946

SAMPLE ARCHIVE #448 (DESCRIPTION - 9777-C3 GROWTH TWINS IN CZT
"EXTRAS THAT ARE BAD.")IN THIS EXPERIMENT DATA WILL BE COLLECTED FROM THE 4 REGIONS
REPRESENTED BY THE COLORS BLACK, ORANGE, YELLOW AND BLUE.

Chemical Imaging for Semiconductor Metrology (CHISM)

[Zn] → Te Precipitate Analysis in CZT
Macro / Micro Inspection

Real Sample



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* GREEN WAS NOT TAKEN BECAUSE IT PRIMARILY ENCOMPASSES THE THIN OUTER EDGE.

* PINK IS THE BACKGROUND.

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Date

990808-jmr-002.tif



BLACK

"BLACK REGION" BOTTOM RIGHT CORNER.

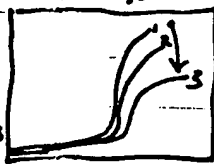
DT 2 SEC 805-865 2nm STEP -21°

AQM 4.08 ROI 131 946 218 1025

B 4X4 TRANSMITTANCE - THYSTEEN BULB.

990908-jmr-003.tif

ORANGE



"ORANGE" REGION - AS BEFORE.

DT 2 SEC. (REST SAME)

* THE TRANSMISSION CURVE DROPS, & SHIFTS RIGHT

THE FURTHER DOWN THE IMAGE TOWNS ARE TAKEN.

* SOME ODD GRAINS APPARENTLY DISAPPEAR.

990908-jmr-004.tif

ORANGE



"ORANGE" REGION DT 1 SEC (REST THE SAME)

* OR ODD GRAINS HAVE DISAPPEARED.

990908-jmr-005.tif

"YELLOW" REGION DT 2 SEC (THE REST IS THE SAME)

990908-jmr-006.tif

990908-jmr-006.tif

"YELLOW" REGION DT 1 SEC

SAME.

990908-jmr-007.tif

"BLUE" REGION DT 2 SEC

SAME.

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Continued on Page

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Signed

7-8-91

Date

J. T. S.

Signed

9/8/91

Date

• 990908-jmr-008. ef

"BLUE" REGION AT 1 SEC
(OTHER PARAMETERS THE SAME.)



allan

2841

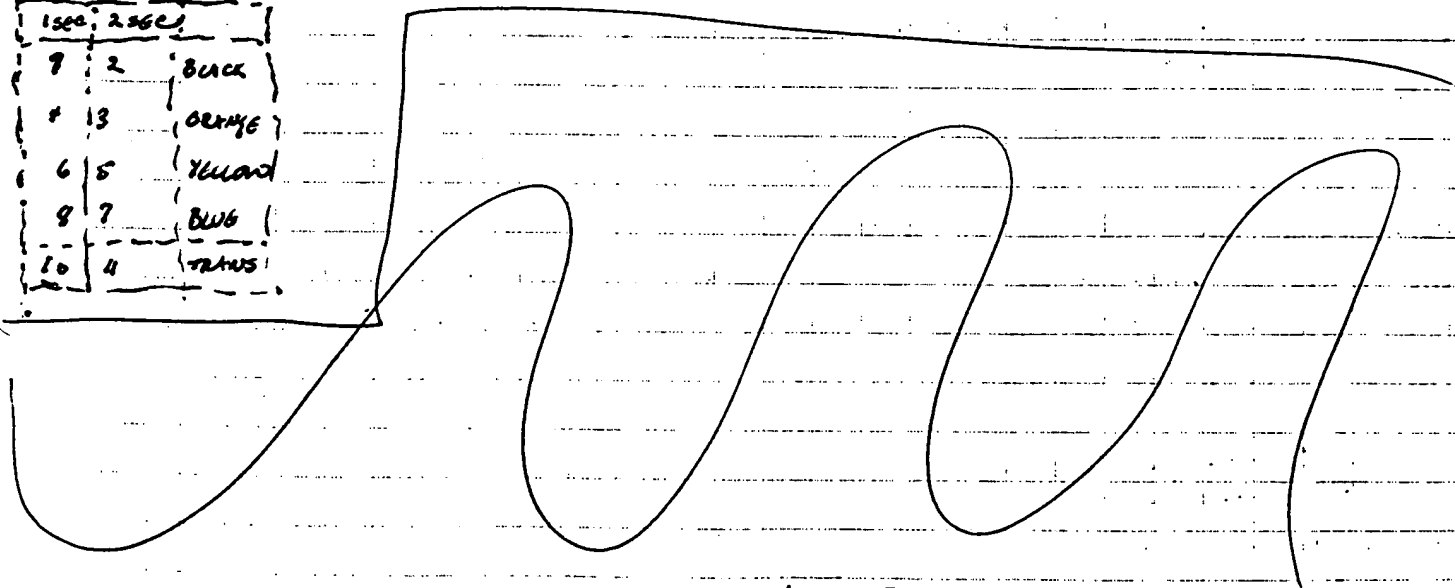
• 990908-jmr-009. ef

"BLACK" REGION AT 1 SEC
(OTHER PARAMETERS THE SAME.)

SUMMARY.

• 990908-jmr-001	RESOLUTION TARGET		
• 990908-jmr-002	BLACK REGION	2 SEC AT	
• 990908-jmr-003	ORANGE	2 SEC	
• 004	ORANGE	1 SEC	
• 005	YELLOW	2 SEC	
• 006	YELLOW	1 SEC	
• 007	BLUE	2 SEC	
• 008	BLUE	1 SEC	
• 009	BLACK	1 SEC	
• 010	(PINK) TRANSMITTANCE LIGHT ONLY - NO CRT	1 SEC	STEP 2 ZAMAN 805-865
• 011	(PINK) " " " " "	2 SEC	ZAMAN " "

1 SEC	2 SEC	
9	2	BLACK
8	13	ORANGE
6	5	YELLOW
8	7	BLUE
10	4	TRANS



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Continued on Page

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Juliana M. Rilan
Signed

September 14, 1999
Date

M. P. R.
Signed

9/17/99
Date

EXPERIMENT OVERVIEW - SEPTEMBER 14, 1999 - RESEARCH

THE FOLLOWING SAMPLES WILL BE USED:

#435 Tellurium PRECIPITATE 10017 TC C2T 47, LIT HIGH DENSITY
GOOD TRANS/EPD 02-03-99 13th LAYER - POLISHED ON ONE SIDE.



Exp 1

#448 - 9777-C3 GROWTH TWINS "EXTRAS THAT ARE BAD."



Exp 3

#472 10229-H3 <111> C2T 47, LOW TRANS CORE C.S.

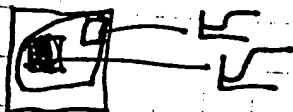


Exp 2

THERE WILL BE 3 EXPERIMENTS USING EACH OF THE SAMPLES.

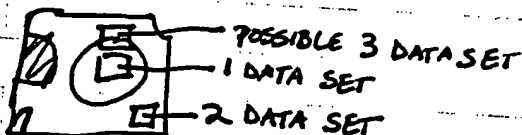
EXPERIMENT #1 TC PRECIPITATE EXPERIMENT

THE RESEARCHER WILL SCAN ACROSS THE ENTIRE ECTF RANGE (700-400 nm) TO DETERMINE THE TRANSMISSION EDGE PARAMETERS. 2 DATA SETS WILL BE TAKEN, ONE ON THE PRECIPITATES AND ONE OFF.



EXPERIMENT #2 CORE REGION EXPERIMENT

IN THIS EXPERIMENT, A BROAD RANGE SCAN AND 2 DATA SETS WILL BE TAKEN, ONE SET ON THE CORE AND ONE OFF. IF THE TWO SETS DIFFER, A BOUNDARY AREA ANALYSIS DATA SET WILL BE TAKEN.



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Continued on Page

Juliana M. R. R. R.

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9/17/99

Date

[Signature]

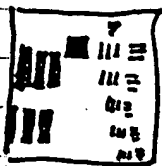
Signed

9/17/99

Date

LAB04 \ C \ clients \ ATP . 190917 \

• 990917-jmr-001-res-targ.tif



RESOLUTION TARGET -20°

TRANSMITTANCE MODE. AT 60 SEC

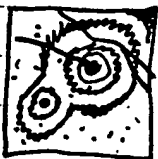
B 1 X 1 ROI-FULL (1035 X 1317)

A6 WINVIEW 32 LCTF'S - 700 nm

SPOT 1

• 990917-jmr-002.tif

*



*NOTE 11-8-99

"ETALONING" EFFECT

DUE TO WAGLE MARKER

ON THE SURFACE

BRIGHT FIELD REFLECTANCE IMAGE. *

CET SAMPLE # 435, LAYER 17 (POLISHED)

TE PRECIPITATE. AT 10 SEC. -20°

B 4 X 4 WINVIEW 32 LCTF'S - 700 nm

• 990917-jmr-003.tif



B 4 X 4 AT 120 SEC (2 MIN) LCTF - 900 nm

-20° WINVIEW. BF REFLECTANCE.

*HALO SURROUNDING THE TWO PARTICLES MUCH

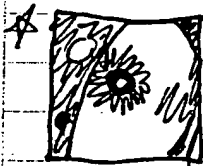
WIDER THAN ^{MORE} ~~DIFFUSE~~ DIFFUSE THAN

IN 002.

• 990917-jmr-004.tif / alled

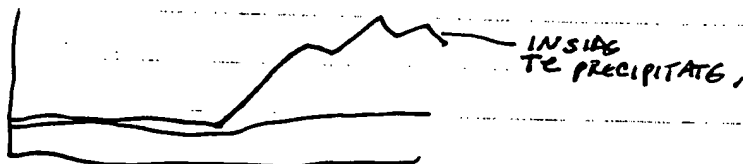
B 4 X 4 AT 10 SEC LCTF 700-1100 nm STEP 10
(41 FRAMES) -20° WINVIEW BF REFLECTANCE,
AQM

• 990917-jmr-005.tif / alled



861 nm

B 4 X 4 AT 30 SEC LCTF 805-865 STEP 2
(31 FRAMES) -20° AQM 5.0 TRANSMITTANCE.
*TRANSMITTANCE EDGE AT 847 nm



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Continued on Page

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Jahana M. Rota.
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2/12/99
Date

[Signature]
Signed

2/17/99
Date

- 990917-jmr-006.tif/alled 805-865 850-860 STEP 5 (3 FRAMES)
 AT 1 MIN TRANSMITTANCE -20°
 B4X4 ADM 5.0.



(THE SIGNAL IS VERY LOW (200 LUX) SO ~~B~~ T)

- 990917-jmr-007.tif/alled 850-860 STEP 5 B8X8 AT 1 MIN (3 FRAMES)
 -20° ADM 5.0 TRANSMITTANCE.



INSIDE PRECIPITATE.

SPOT 2

- 990917-jmr-008.tif 700nm AT 1 SEC B4X4 -20° WINVIEW.



↑ REFLECTANCE
 OF



- 990917-jmr-009.tif/alled 840-870nm STEP 5 B8X TRANSMITTANCE
 AT 2 min

SPOT 3

- 990917-jmr-010.tif 700nm 1 SEC -20 B 4X4 BF REFLECTANCE



* HUGE PARTICLES. LINES SURROUNDING PARTICLE RESEMBLE
 MAGNETIC LINES FIELDS FLOWING THROUGH AN OBJECT
 WITH POLES, SUCH AS THE EARTH.
 ETALONING EFFECT.

- 990917-jmr-011.tif 840-870nm STEP 5 TRANSMITTANCE B8X8
 AT 2 MIN.

120

Continued on Page

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Juliana M. R. t.

Signed

9/2/19

Date

Juliana M. R. t.

Signed

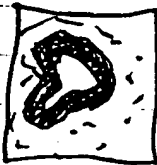
9/2/19

Date

(50074)

990917-jmr-012.tif

700nm 1SEC DT -20° B4X4
REFLECTANCE



990917-jmr-013.tif

840-870nm STEP 5 B8X8 -20°
AQM 5.0 DT 2MIN TRANSMITTANCE

SUMMARY 9/17/99

			STEP		
001 -	RES TALS				
002 -	SPOT 1	REFLECTANCE	700nm	B4X4	10SEC
003 -	SPOT 1	REF	900nm	B4X4	2 MIN
004 -	SPOT 1	REF	700-1100 nm	B4X4	10 SEC
005 -	SPOT 1	TRANS	805-865	2 B4X4	30 SEC
006 -	SP 1	TRANS	850-860	5 B8X8	4X4 1MIN
007 -	SP 1	TRANS	850-860	5 B8X8	1MIN
008 -	SP 2	REF	700nm	B4X4	1 SEC
009 -	SP 2	REF TRANS	840-870	5 B8X8	2MIN
010 -	SP 3	REF	700nm	B4X4	1 SEC
011 -	SP 3	TRANS	840-870	5 B8X8	2MIN
012 -	SP 4	REF	700nm	B4X4	1 SEC
013	SP 4	TRANS	840-870	5 B8X8	2MIN

EXPERIMENTAL
WITH EXPOSURE
TIMES + BINNING
PARAMETERS
TO DETERMINE
THE BEST
SETTINGS!

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Continued on Page

Read and Understood By

Jahim R. R. R.
Signed

9/20/99
Date

CMPS
Signed

9/20/99
Date

Tuesday, September 28, 1999

ALL 9-28-99 FILES MOVED TO MOTHRA 11-16-99

• 990928-jmr-001.tif

1 FRAME AT 1 MIN (HALF POWER LIGHTING) ON CORE REGION
#472 675nm B4X4 AQM 5.0 -30° BF REFLECTANCE

• 990928-jmr-002/allod.tif

21 FRAMES AT 1 MIN (FULL POWER) ON CORE REGION
(SAME POSITION AS 001) #472 700-1100nm
20nm STEP B4X4 AQM 5.0 -30° TRANSMITTANCE.

• 990928-jmr-003.tif

1 FRAME AT 1 MIN (HALF POWER LIGHTING) OFF CORE
#472 #700nm B4X4 AQM 5.0 -30° REFLECT.

• 990928-jmr-004/allod.tif

21 FRAMES AT 1 MIN (FULL POWER) OFF CORE
(SAME POSITION AS 003) #472 700-1100nm
20nm STEP B4X4 AQM 5.0 -30° TRANSMITTANCE.

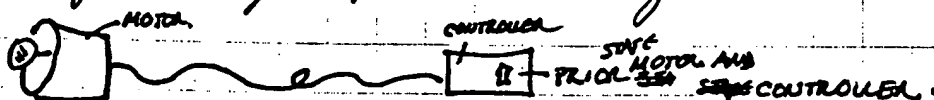
• 990928-jmr-005.tif

1 FRAME AT 1 MIN (HALF POWER LIGHTING) BORDER CORE
#472 700nm B4X4 AQM 5.0 -30° BF REFLECT.

• 990928-jmr-006.tif/allod

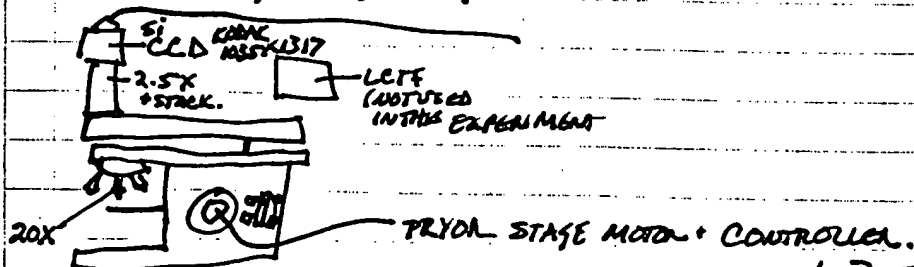
21 FRAMES AT 1 MIN (FULL POWER) BORDER
700-1100nm 20nm STEP #472 SAME POSITION AS 005.
B4X4 AQM 5.0 -30° RE TRANSMITTANCE.

Tuesday, October 12, 1999. - Most of the morning was spent troubleshooting the 3-D MOTOR.



AT THE PRESENT MOMENT, THE STAGE MOTOR ONLY RESPONDS RANDOMLY TO 1/2 OF THE COMMANDS SENT TO IT.

PRESENT CONFIGURATION . . .



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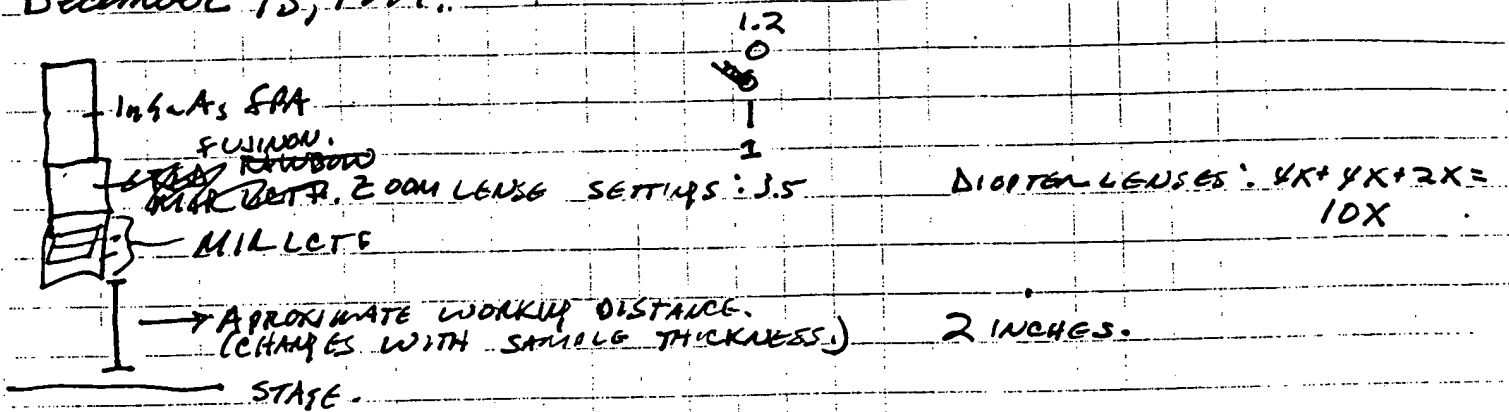
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Read and Understood By

Juliana J. Khan
SignedOct 12, 1999
DateC.M.F. J.
Signed10/12/99
Date

PROJECT ATP-MACRO-A CaCO₃

December 13, 1979.



ALL IMAGES SCANNED FROM 1000-1700nm STERS 10nm. 2 TUNGSTEN BULBS.
4QM 4.0 TRANSMISSION MODE. SAMPLES PLACED ON PLASTIC STAGE.

- 991213-jmr-001-asp-CaCO₃-TRANS. del asp-CaCO₃ TABLET.
+ STRAY LIGHT WYSYS.
- 991213-jmr-002-asp-CaCO₃-TRANS. del asp-CaCO₃ TABLET. 3 STRAY LIGHT.
- 991213-jmr-003-asp-CaCO₃-TRANS. del WHOLE TABLET.
BEST IMAGE OF CaCO₃ + ASPRIN TABLET.
- 991213-jmr-004-LIGHT-TRANS. 2 TUNGSTEN BULBS. - STAGE REMOVED.
NOTHING BETWEEN LOT'S + BULBS.
- 991213-jmr-003 DIV 004 del DIVIDED IMAGE.
- 991213-jmr-003 DIV 009-NDIM del PCT 1-6 NO NORMALIZATION.
* INTERESTING.
- 991213-jmr-005-asp-TRANS. WHOLE TABLET. ASPRIN (SELF-MARKED).
- 991213-jmr-005 DIV 002 del DIVIDED IMAGE.
- 991213-jmr-005 DIV 004-NDIM del PCT 1-6 NO NORMALIZATION.
- STAGE MOVED -
- 991213-jmr-006-CaCO₃-TRANS. WHOLE TABLET CaCO₃. (UNDER MECH) ^{TABLET}
TO MAKE CONTACT
- 991213-jmr-007-LIGHT-TRANS. del (NEW LIGHT SOURCE TAKEN).
- 991213-jmr-006 DIV 007 del DIVIDED IMAGE.
- 991213-jmr-006 DIV 007-NDIM del PCT 1-6, NO NORMALIZATION.
- * THESE IMAGES WERE DIVIDED BY A LIGHT IMAGE w/ NO BASE PLATE. THEY WERE DELETED, A NEW
BACKGROUND WAS TAKEN w/ BASE PLATE + NEW ANALYSIS COMPLETED.

Continued on Page

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Jalimar W. R. R.
Signed

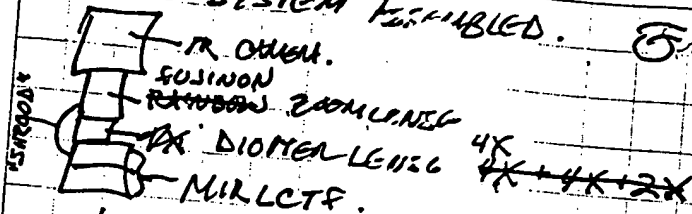
170
12-13-79.
Date

[Signature]
Signed

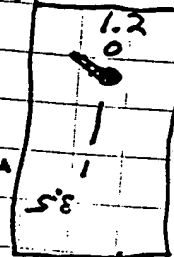
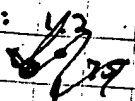
1/31/00
Date

NUCLEO SYSTEM TESTED.

Friday, December 10, 1999.



SETTINGS:



TARGET OF A MIXTURE

WORKING DISTANCE. 2.7 METERS.

○ LIGHT SOURCE - REFL COPY STAND.

○ LIGHT SOURCE - TRANS.

ALL IMAGES SCANNED FROM 1000 - 1700 NM. 1/10 NM STEPS. TUNGSTEN BULBS (2) USED FOR ALL IMAGES BUT DARK. MICRO

991210-jmr-001-DARK.

991210-jmr-001-REFL TARGET

991210-jmr-002-LIGHT-TRANS. REF. TARGET - TRANS MODE.

991210-jmr-003-ASP. NUCIT. TRANS. REF. LIGHT IMAGE. NO SAMPLE. TRANSMITTANCE MODE. SAMPLE ADDED.

991210-jmr-004-ASP. NUCIT. REFL. REF. LIGHT SOURCE ONLY MOVED. ASP, NUCIT 50/50. TABLET. TRANS. MODE.

991210-jmr-005-LIGHT. REFL. REF. SAMPLE REMOVED. LIGHT SOURCE ONLY MOVED. ASP, NUCIT 50/50. TABLET. REFL. MODE.

991210-jmr-006-DARK. REF. LIGHT SOURCE. REFL. MODE.

991210-jmr-007-ASP-CAC03-REFL. REF. DARK IMAGE. SAMPLE ADDED. CAC03 + ASP 50/50 TABLET. REFL. MODE.

991210-jmr-008-ASP-CAC03-TRANS. REF. LIGHT IMAGE. SAMPLE ADDED. CAC03 + ASP 50/50 TABLET. TRANS. MODE.

991210-jmr-009-ASP-CAC03-TRANS. REF. LIGHT ONLY. TRANS. MODE. SAMPLE REMOVED. LIGHTS NOT MOVED.

NO NORMALIZATION.

PCA 1-6

QUICKCOS, COSINE

PCA 1-6

QUICKCOS, COSINE

PCA 1-6

QUICKCOS, COSINE

PCA 1-6

QUICKCOS, COSINE

Continued on Page

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Signed: *[Signature]* 12-13-99

Date

Read and Understood By

Signed

Date

February 28, 2000. Monday.

Sil testing - Micro NIR System (ONE)

WAFER

• 000228 - jmr, 01 - SIL SPOT 1 T. 4



"LADDER".

X COLLECTING IR DATA WHEN

RAMAN DATA HAD BEEN COLLECTED.

SIL WAFER (#444) REEL MODE. TUNGSTEN FULL POWER
1000-1700 nm 10nm STEPS. 71 FRAMES.
InGaAs IR 20X. MIRCLECTS. DT 16ms
SPOT 1 10,781 KIS 10 KVC.

• 000228 - jmr, 02 - SIL SPOT 2 T. 4



SIL WAFER 444 TRANS MODE. TUNGSTEN. 3 BARS
1000-1700 nm 10nm STEPS. 71 FRAMES
InGaAs IR 20X MIRCLECTS. DT 16ms SPOT 1 10 KVC.

Continued on Page

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Read and Understood By

Johanna M. Rha.

Signed

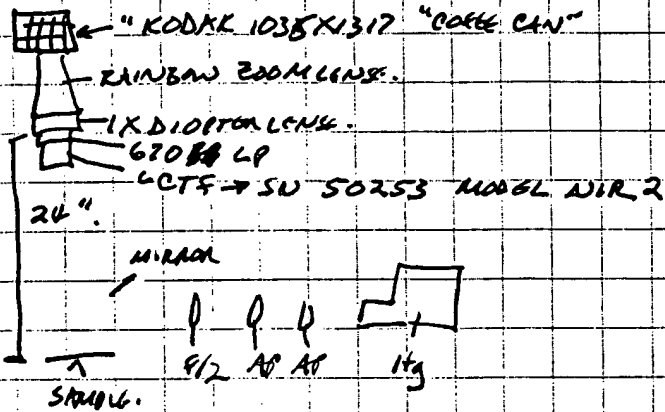
March 1, 2000.

Date

Signed

Date

MACRO SYSTEM CONFIGURATION.



OBJECTIVE: TO VIEW PL ACTIVITY IN THE IR REGIONS.

000301-jmr-06-CZT-DETECT ^{POOTH} CZT# 438 → MAGA W/ NO VISIBLE DEFECTS.
 ROI: 325, L 625, B 625, R 900 B 1 X 1
 AT 30 SEC 700-1100nm, 10nm STEPS.
 PCA, CCA, CCA PCA.

000301-jmr-07-DETECT RICH CZT# 439 → FULL OF DEFECTS.
 BRIGHT SPOT AT 900. → SPOT 11
 APPEARS TO NAKED EYE A SHADE DARKER
 THAN THE BULK MATERIAL.
 100-154.
 MANY EVENTS
 TOO MUCH COSMIC ~~EVENTS~~ DUE TO ΔT

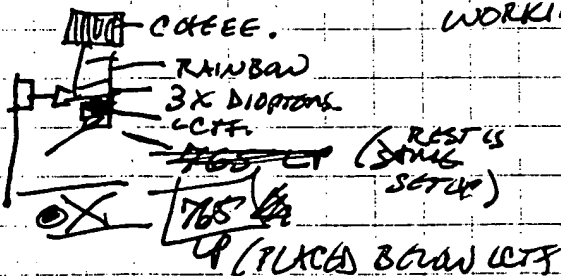
Thursday, March 2, 2000. ∴ ΔT , $\uparrow B$

000301-jmr-01-CZT ⁴³⁸ CZT# 438 SMALL 2" SQUARE PIECE.
 2 GRAIN DIRECTIONS. ROI: F 150, L 100, B 1000, R 875
 B 9 X 4, AT 5 SEC 675-1100nm @ 5nm 86 FRAMES
 DARK SHADOW APPEARS IN LOWER L. OR 450 UNKNOWN AT THIS TIME.

→ NOW CONFIG.

WORKING DISTANCE:

LCTF # 50253



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Read and Understood By

Continued on Page

Juliana M. Zito. 3200

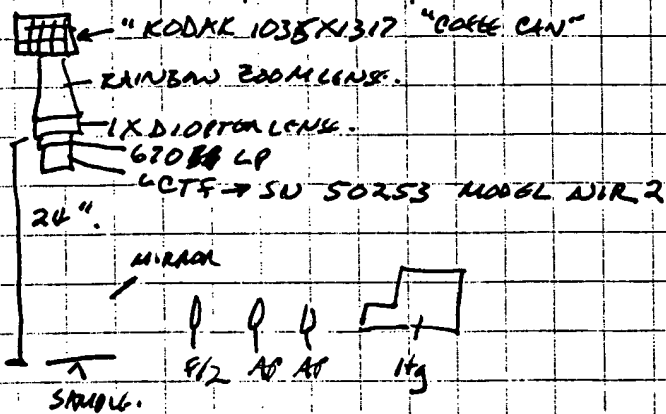
Signed

Date

Signed

Date

MACRO SYSTEM. CONFIGURATION.



OBJECTIVE: TO VIEW PL ACTIVITY IN THE IR REGIONS.

000301-jmr-06-CET DEECT ^{POOTH} CET# 438 → AREA W/ NO VISIBLE DEFECTS.
 ROI: 325, L 625, B 625, R 900 B1X1
 AT 30 SEC 700-1100nm, 10nm STEPS.
 PCH, CCH, CCHPCA.

000301-jmr-07-DEECT RICH CET# 439 → FULL OF DEFECTS.
 BRIGHT SPOT AT 900. → SPOT 11 APPEARS TO NAKED EYE A SHADE DARKER
 THAN THE BULK MATERIAL.
 100-154.

MANY EVENTS
 TOO MUCH COSMIC ~~EVENTS~~ DUE TO ΔT

Thursday, March 2, 2000. ∴ ΔT , $\uparrow B$

000301-jmr-01-CET ⁴³⁸ ~~438~~ CET# 438 SMALL 2" SQUARE PIECE.
 2 GRAIN DIRECTIONS. ROI: F150, L100, B1000, R875
 B 9X4, AT 5 SEC 675-1100nm @ 5nm = 86 FRAMES
 DARK SHADOW APPEARS IN LOWER L. ORIGIN UNKNOWN AT THIS TIME.

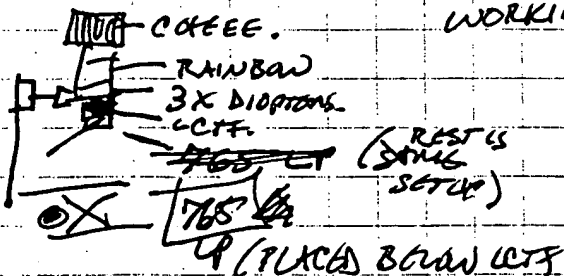
→ NOW CONFIG.

WORKING DISTANCE:

19 1/2"

SAMPLE → LONG PRESS.

LCTF # 50253



Continued on Page

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Juliana M. Zita . 3200

Signed

Date

Signed

Date

• 000228-jmr-03-SIR SPOT 2 T. 1/2



INTERESTING DATA.

THE SIDES BECOME LIGHTER/DARKER
W/ DIFFERING λ 'S.SIR WAFER 444. TRANS MODE. SPOT 2
3 LIGHT BARS. 1000-1700 nm 10 nm
STEPS. 71 FRAMES. InGaAs, IR20X,
MIRLCTF. ΔT 16MS. 10AVE.

• 000228-jmr-04-SIR SPOT 2 R. 1/2

SIR WAFER 444 SPOT 2. FULL LIGHT. 10AVE.
REF. MODE. 1000-1700 nm 10 nm STEPS.
71 FRAMES InGaAs. IR20X, MIRLCTF, ΔT 16MS.

• 000228-jmr-05-SOURCE T. 1/2

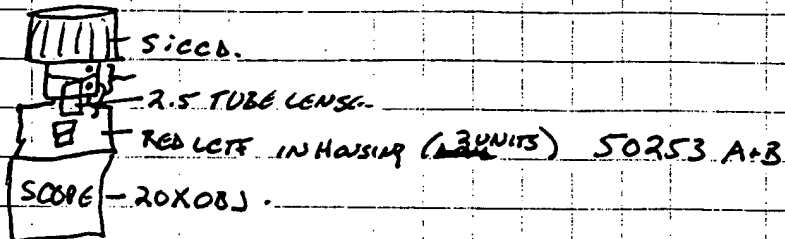
UNFOCUSED SLIDE. FULL LIGHT. R. MODE. 10AVE.
1000-1700 nm 10 nm STEPS. 71 FRAMES.
InGaAs, IR20X, MIRLCTF, ΔT 16MS.

• 000228-jmr-06-SOURCE T. 1/2

UNFOCUSED SLIDE. ^{10AVE.} 3 LIGHT BARS. T. MODE.
1000-1700 nm, 10 nm STEPS. 71 FRAMES.
InGaAs, IR20X, MIRLCTF. ΔT 16MS.

June 1, 2000 Thursday.

ATV - PL OF CBI



• 000601-jmr-01-restarg. t/f

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RESOLUTION TARGET. (6-7) 20XOBJ. TRANS MODE.
680nm. 1 FRAME. ΔT 1 SEC. 82X2SPOT 1

• 000601-jmr-02-ZnSe T. t/f

ZnSe #485. W SOURCE T 700-1100nm @ 10:
41 FRAMES. PEAKS / SHARPEST IMAGES AT
900 + 990 nm. 82X2 ΔT 1 SEC. 20X.

• 000601-jmr-03-ZnSe R. t/f

R MODE - MERCURY SOURCE. ZnSe #485
700-1100nm @ 10nm STEPS = 41 FRAMES
82X2 ΔT 1 SEC. 20X (SAME SPOT)SPOT 2

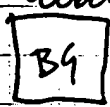
• 000601-jmr-04-ZnSe-T. t/f

TUNGSTEN SOURCE. ZnSe #485
850-1100nm @ 10nm STEPS = 26 FRAMES.
82X2 ΔT 1 SEC. 20X (SPOT 2) T MODE

• 000601-jmr-05-ZnSe-R. t/f

MERCURY SOURCE R MODE SPOT 2 ZnSe #485
850-1100nm @ 10nm STEPS = 26 FRAMES
R MODE. 82X2

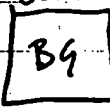
• 000601-jmr-06-BGT. t/f



FOR 04

TUNGSTEN SOURCE : BACKGROUND UNFOCUSED SLIDE
850-1100nm @ 10nm STEPS = 26 FRAMES.
82X2 ΔT 1 SEC. 20X T MODE.

• 000601-jmr-07-BGR. t/f



FOR 05

MERCURY SOURCE BACKGROUND UNFOCUSED SLIDE
850-1100nm @ 10nm STEPS = 26 FRAMES
82X2 ΔT 1 SEC. 20X R MODE

-330-385 BP AT SOURCE, 665LP AT LENS ADDON.

Continued on Page

Read and Understood By

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Jaham M. Rho.

Signed

June 1, 2000

Date

Signed

Date

• 000802-jmr-05-CETS-MICRONIR-T. TESTING OF XYZ STAGE SOFTWARE
 I ACQUISITION ACQUISITION MANAGER SETTINGS BINARY MONTAGE C1 SOFTWARE
 SCAN AREA $L(0,0) R(263) (K,0)$
 $L=0 T=0 R=3200 B=2630$ - PIXELS
 STEPSIZE - HORIZONTAL - 381 STEPS VERTICAL - 292 STEPS
 X AXIS # STEPS 109 Y AXIS # STEPS 1010
 10 FRAMES AVE. FULL CHIP FILTER DISABLED.
 90 FRAMES TOTAL (9 X AXIS X 10 Y AXIS FRAMES)
 NOLOTF, SENSOR'S UNLIMITED FRA (INFRAS), TUNGSTEN TMODE.
 BK-60 PLATFORM, 20X IR OPTIMIZED OBJECTIVE.

II ANALYSIS

CHEMIMAGE 4.35

PARTIAL STATISTICS. 000802

• 000802-jmr-06-STAGE ONLY-BG FOR 05 BACKGROUND - GLASS STAGE ONLY.
 TUNGSTEN TMODE. 2696
 HORIZONTAL - 3945 PIXELS, 11 FRAMES. VERT 2661
 $381 \text{ STEPS PIXEL/FRAME}$ $292 \text{ STEPS PIXEL/FRAME}$ = 10 FRAMES.
 $11 \times 10 = 110$
 $9 \times 10 = 90$ FRAMES TOTAL.

• 000802-jmr-05-TMODE (SAME AS 06)
 • 000802-jmr-06-CET 435 MICRO NIR R MODE. - SAME AS 05 - R MODE.
 HORIZONTAL - 3962 PIXELS = 11 HORIZONTAL FRAMES. VERT: 2696 PIXELS = 10 FRAMES
 381 PIXELS/FRAME 292 PIXEL/FRAME
 $11 \times 10 = 110$ TOTAL FRAMES.
 (12 STAGE) TUNGSTEN R MODE. W/ 12 AS FRA (SENSOR'S UNLIMITED)
 20X IR OBJ. BK-60 PLATFORM. 10 FRAMES AVERAGE.

• 000802-jmr-07-BG FOR 06 RMODE. BACKGROUND FOR 06. R MODE GLASS
 STAGE ONLY. 110 FRAMES.

• 000802-jmr-08-BG FOR 05 TMODE. TMODE. BACKGROUND FOR 05.
 STAGE ONLY 110 FRAMES.

• 000802-jmr-02-MACROBT - DIGITAL IMAGE MONOSYS CORRECTION (OI DATA)
 • 000802-jmr-03-MICRONIR - DIGITAL IMAGE MICRO NIR SYS (NOLOTF)
 • 000802-jmr-04-MICRONIR - CLOSURE LOGS OF X & Y

Continued on Page

Read and Understood By

Juliana M. R. R.
 Signed

August 17, 2010.
 Date

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Signed

Date

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